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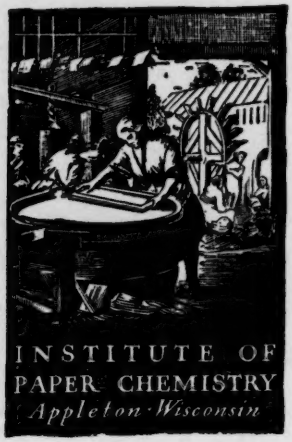
BULLETIN

OF

THE INSTITUTE OF PAPER CHEMISTRY



AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

LIBRARY NOTES

JANUARY · 1949

Volume 19 Number 5

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Books and Pamphlets Added to the Library During December

BIOLOGY

WELCH, PAUL S. Limnological methods. Philadelphia, Blakiston [c1948] 381 p.

CHEMICAL REACTIONS

GLASSTONE, SAMUEL, LAIDLER, KEITH J., and EYRING, HENRY. The theory of rate processes; the kinetics of chemical reactions, viscosity, diffusion and electrochemical phenomena. New York and London, McGraw-Hill Book Co., 1941. 611 p.

MOELWYN-HUGHES, E. A. The kinetics of reactions in solution. 2d ed. Oxford, Clarendon Press, 1947. 424 p.

CHEMICALS—MANUFACTURE AND INDUSTRY

CONCANNON, C. C., and SWIFT, A. H. World chemical developments, 1940-46. Part 2. U. S. Office of International Trade. Industrial series no. 81. Washington, U. S. Govt. Print. Off., 1948. 131 p.

CHEMISTRY—LABORATORY MANUALS

SANDERSON, ROBERT THOMAS. Vacuum manipulation of volatile compounds; a laboratory manual describing the application of high vacuum technique in experimental chemistry. New York, Wiley, 1948. 162 p.

CHEMISTRY, ANALYTIC

WILLARD, HOBART H., MERRITT, LYNNE L., JR., and DEAN, JOHN A. Instrumental methods of analysis. New York, etc., Van Nostrand, 1948. 247 p.

CHEMISTRY, ORGANIC—SYNTHESIS

ORGANIC SYNTHESES, an annual publication of satisfactory methods for the preparation of organic chemicals. H. R. Snyder, editor-in-chief. New York, Wiley [c1948] v. 28. 121 p.

INSECTICIDES

FREAR, DONALD E. H. Chemistry of insecticides, fungicides, and herbicides. 2d ed. New York, Van Nostrand [c1948] 417 p.

LUMBERING

BROWN, NELSON COURTLANDT. Logging; the principles and methods of harvesting timber in the United States and Canada. New York, Wiley [c1949] 418 p.

MICRO-ORGANISMS

ANNUAL REVIEW of microbiology. Charles E. Clifton, editor; Sidney Raffel and H. Albert Barker, associate editors. Stanford, Cal., Annual Reviews, Inc., 1948. v. 2. 532 p.

MINES AND MINERAL RESOURCES

[U. S. BUREAU OF MINES] Minerals yearbook, 1946. Prepared under the direction of E. W. Pehrson; Allan F. Matthews, editor [Washington, U. S. Govt. Print. Off., 1948] 1629 p.

ROTPROOFING

WEATHERBURN, MURIEL W. The rotproofing of textiles and related materials; a survey of literature. National Research Council of Canada. N.R.C. no. 1601. Ottawa, The Council, 1947. 184 p.

RUBBER

BALL, J. M. Reclaimed rubber, the story of an American raw material. New York, Rubber Reclaimers Association, Inc., 1947. 248 p.

STATISTICS

YULE, G. UDNY, and KENDALL, M. G. An introduction to the theory of statistics. 13th ed., rev. London, Charles Griffin & Co., Ltd., 1948. 570 p.

STRAW

WHALLEY, MURIEL E. Abstracts on the utilization of straw. National Research Council of Canada. N.R.C. no. 1242. Ottawa, The Council, 1944. 442 p.

TRADE DIRECTORIES

CHEMICAL ENGINEERING CATALOG; the process industries' own catalog, 1948-49. 33d ed. New York, Reinhold [c1948] 1767 p.

NATIONAL DIRECTORY of the Canadian pulp and paper industries, 1948. Donald W. Emmerson, editor. Gardenvale, Que., National Business Publications Limited, 1948. 488 p.

TREES

LEBARRON, RUSSELL K. Silvicultural management of black spruce in Minnesota. U. S. Department of Agriculture. Circular no. 791. Washington [U. S. Govt. Print. Off.] 1948. 60 p.

U. S. NATIONAL BUREAU OF STANDARDS—PUBLICATIONS

U. S. NATIONAL BUREAU OF STANDARDS. Publications of the National Bureau of Standards, 1901 to June 30, 1947. National Bureau of Standards circular 460. Washington, U. S. Govt. Print. Off., 1948. 375 p.

VACUUM TUBES

RIDER, JOHN F. The cathode-ray tube at work. New York, John F. Rider, Publisher, Inc. [c1935, 29th printing, 1948] 336 p.

WOOD

BROWN, H. P., PANSHIN, A. J., and FORSAITH, C. C. Textbook of wood technology. v. I. Structure, identification, defects, and uses of the commercial woods of the United States; formerly published under the title Commercial timbers of the United States. New York, etc., McGraw-Hill Book Publ. Co., 1949. 652 p.

Survey of Periodical Articles

The following are abstracts of opinions expressed by writers in the technical journals. The Institute of Paper Chemistry takes no responsibility for the opinions here summarized.

ADHESIVES

McLaren, A. D. Adhesion of high polymers to cellulose. Influence of structure, polarity, and tack temperature. J. Polymer Sci. 3, no. 5: 652-62 (October, 1948); *cf.* B.I.P.C. 18: 735.

This covers essentially the same information as the previous reference; the present article includes experimental data and is, in general, more extensive. 21 references. E.S.

AIR CONDITIONING

Weber, Charles G. Importance of airconditioning to the converter. Am. Paper Converter 22, no. 12: 16-18 (December, 1948).

The author considers the effects of atmospheric conditions and variations on the dimensions of the paper fibers and, therefore, of the paper itself, and on the stiffness and rattle, folding, creasing, and tear of paper and the means by which moisture control can solve operating problems in converting industries, especially in printing and paper yarn manufacture. Wavy and tight edges and static electricity are discussed briefly. 13 references. R.R.

ALCOHOL

Lassenius, T. The manufacture of sulfite alcohol in Sweden and Finland. Cellulosa och Papper, SPCI 1908-1948: 398-405 (1948). [In Swedish; English summary]

The author reviews the development of the sulfite alcohol industry in Sweden and Finland, supplemented by tabulated data and graphs. The first sulfite alcohol in the world was manufactured at Skutskär in Sweden in 1909; at present, there are 34 sulfite alcohol mills in Sweden and 17 in Finland. 12 references. E.S.

ALKALINE PROCESSES—RECOVERY

Bergström, Hilding. By-products from the manufacture of sulfate pulp. Cellulosa och Papper, SPCI 1908-1948: 346-63 (1948). [In Swedish; English summary]

The author reviews the by-products obtained in sulfate cooking, supplemented by tabulated data. The yield and composition of the extracts of spruce, pine sapwood and heartwood, and kindling wood high in resinous matter are given, i.e., the substances from which tall oil and turpentine originate. The yield of crude tall oil, reasons for possible low yields, and conversion products obtained on refining are discussed. Methods for the production of sulfate turpentine and methanol are described, with a brief reference to the manufacture of sulfite methanol. Various suggestions are given for recovering valuable by-products from black liquor. In conclusion, reference is made to air and stream pollution, as well as to the hazards of spontaneous combustion inherent in the manufacture of sulfate by-products. 16 references. E.S.

ANTIOXIDANTS

CARLIN, G. T. Packaging materials which resist rancidity. Food Inds. 20, no. 12: 1750-1, 1872, 1874 (December, 1948).

Swift & Co. Research Laboratories have been studying the use of antioxidants impregnated into cardboard and dispersed in the coating of cardboard and paper as a solution to the problem of rancidity development in packaged fats and fat-containing foods. Observations made lead to the conclusion that oxidation catalysts are present in the paper used for such packages, and that these agents probably account for the unusual rapidity with which the keeping quality is lost. Data are tabulated on the effect of paperboard on the keeping quality of lard, oleo oil, hydrogenated shortening, and hydrogenated lard, of potato chips in various packages, of fats in cookies vs. fats in paperboard, and of prepared mixes. Cardboard strips impregnated with 1 gram of hydrogenated shortening incubated at 145° F. kept for 2 days; with 2.5% pyrogallol solution or 2.5% galacetonin, the time increased to over 90 days. Lard in a parchment-lined paraffined carton at room temperature kept for 30 days before becoming rancid. When the liner was made with gum guaiac in the sizing, rancidity was noticeable only after 180 days. R.R.

ASSOCIATIONS

BRAUNS, OTTO. The office of the technical secretary of the Svenska Pappers- och Cellulosaingeniörsföreningen. Cellulosa och Papper, SPCI 1908-1948: 49-59 (1948). [In Swedish; English summary]

An account is given of the purpose and plans behind the organization of the office of the technical secretary, which began to operate in 1939. The office was created for the purpose of co-ordinating technical work of interest to the industry outside the scope of the research laboratories. The activities of the past are reviewed and suggestions for the future given. E.S.

HULTMAN, GUNNAR. The collaboration between the Scandinavian paper and pulp associations. Cellulosa och Papper, SPCI 1908-1948: 60-8 (1948). [In Swedish; English summary]

Reference is made to the collaboration of the Danish, Finnish, Norwegian, and Swedish paper and pulp associations which has been very active in recent years. The foundation, achievements, activities, and present organization are described. E.S.

BARK

KOTTWITZ, FRANK A., and FORMAN, LOREN V. Sodium palconate production. Ind. Eng. Chem. 40, no. 12: 2443-50 (December, 1948).

Sodium palconate is an effective agent in controlling viscosity and water loss in drilling; it has other applications as a dispersing agent. Pilot plant production of powdered sodium palconate by alkaline extraction of redwood bark dust, followed by concentration and spray-drying of the extract, was conducted to extend laboratory methods and prove a tentative process for preparation of the caustic extract, to obtain samples of the material for field testing, and to provide engineering data for use in the design and operation of a commercial plant. Flow sheets and descriptions of the equipment, process, and material are included in the paper. E.S.

BARKERS AND BARKING

FOLIN, TH. The barking of pulpwood. Cellulosa och Papper, SPCI 1908-1948: 243-57 (1948). [In Swedish; English summary]

The author describes the principal constructions and improvements on barking devices used in Sweden since the first knife barker was employed around 1880. E.S.

BLACK LIQUOR

BASBERG, A. The net calorific value of black liquor obtained in the sulfate process. Cellulosa och Papper, SPCI 1908-1948: 364-73 (1948). [In Swedish; English summary]

The great improvement in heat recovery systems in modern sulfate mills requires more accurate methods for determining the amount of heat produced in burning black liquor and a more individual thermochemical evaluation of the different recovery systems. The generally employed values for amount of dry substance, calorific value, heat of reduction, etc., should be disregarded and the same consideration to quantity and quality of the black liquor be given as to the fuel used in any other heating plant. The author discusses the influence of the drying procedure on the chemical composition of the black liquor and its gross calorific value, and the dependence of the net calorific value upon the chemical composition of the black ash or the melt. To make a combustion analysis of black liquor, it is necessary as a rule to evaporate it to about 80% dryness. Investigations have shown that the drying procedure will influence the proportion of organic matter to ash, as well as the chemical composition of each component, and that the gross calorific value of the dry substance of the liquor decreases during drying. The gross calorific value of the black liquor is generally used as a basis for calculating the available quantity of free heat in the recovery system, from which is deducted about 80% of the heat required to reduce sodium sulfate to sodium sulfide. The author shows that this adjustment gives incorrect results. An equation is developed by comparing combustion data in a calorimetric bomb and in a usual recovery furnace, which takes into consideration the total amount of carbon, sulfur, hydrogen, and oxygen which are combined with sodium in the black ash. E.S.

BLEACHING

GIERTZ, HANS WILHELM. The present status of the chemistry of bleaching. Cellulosa och Papper, SPCI 1908-1948: 326-38 (1948). [In Swedish; English summary]

Bleaching operations are considered to be primarily a continuation of the dissolution of the lignin. Theoretical aspects of bleaching with chlorine, hypochlorite, chlorine dioxide, and chlorite are given, including the chemical reaction of these agents with the lignin, as well as the carbohydrate constituents of pulp. The effect of the bleaching agents on the quality of the resulting pulps is mentioned. The difference between sulfite and sulfate pulps is discussed, as well as the effect of the cooking process upon the degree of condensation of the lignin and, consequently, on the bleachability of the pulp. E.S.

RICHTER, JOHAN. The development of bleaching techniques. Cellulosa och Papper, SPCI 1908-1948: 339-45 (1948). [In Swedish; English summary]

The author reviews the mechanical development of chiefly Scandinavian

bleaching equipment, such as agitators in Bellmer bleachers with washing drums; Thunes high-density (7-9% consistency) stock circulating pumps; washing filters (Wolf, Oliver, Kamyr, etc.); batch and continuous high-density bleaching, followed by chlorination, an acid wash stage, and efficient alkali treatment; the Kamyr continuous chlorination and, finally, continuous multistage bleaching in all the steps involved. Recently, the Kamyr continuous alkaline cooking at high density has been introduced for producing special high-alpha pulps. In some plants, chlorite or chlorine dioxide is used in the place of hypochlorite, and this trend is expected to continue and lead to further developments. E.S.

WOODSIDE, VERNON, MCEWEN, R. L., SCHUBER, JOHN, and RUSSELL, L. E. Condensation of round table discussion on pulp bleaching. Paper Trade J. 127, no. 24: 21-5 (Dec. 9, 1948).

Questions on bleaching were asked by the audience and answered by panel members. E.S.

BLEACHING—GROUNDWOOD

ABELE, WILHELM. Saving in wood—bleaching of groundwood. Das Papier 2, no. 17/18: 321-3 (September, 1948). [In German] *cf.* B.I.P.C. 18:739.

In answer to the discussion by Grünewald, the author stresses the economic advantages and upgrading of groundwood pulp through bleaching; he favors the process for German conditions. L.E.W.

BOARD

BEHR, E. A. Preservation of fiber insulating board with chlorinated phenols. Tech. Assoc. Papers 31: 388-93 (1948); Paper Ind. 30, no. 6: 930-5 (September, 1948).

In termite-infested regions and locations where the decay hazard is great, adequate treatment of fiberboard is desirable to prevent such attacks. Test plot data on treated fiberboard samples indicate that treatment of the pulp suspension with sodium pentachlorophenate and precipitation by alum increases the life of the board five to ten times over that of untreated controls. When the sodium pentachlorophenate is precipitated on the pulp by copper sulfate, the treatment is about twice as effective as when alum is used. These observations were noted on a range of fiberboards made from such materials as southern pine, northern softwoods, and waste paper in plots in Louisiana and Florida. E.S.

STRAMIT BOARDS, LTD., *Stowmarket, Suffolk.* Straw and paper building board. Paper Making and Paper Selling 67, no. 3: 36, 35 (Autumn, 1948).

An English-made building board, Stramit, is different from most wallboards in that the straw used in its manufacture is not pulped, but compressed at 150° C. into a continuous slab which is faced with paper on the front, back, and two long edges. The slab is cut to the desired length, normally 8-10 feet. The resulting board is very rigid and can be used as a partition wall without further treatment; it can be painted or distempered as soon as it comes off the machine, or plastered if the paper is torn off; and it has a high fire resistance, thermal value, and good acoustical properties and can be handled easily. The board is, or will soon be, made in Sweden, Denmark, Finland, Holland, France, Argentina, and South Africa. R.R.

SUNDBERG, GUSTAF. The development of the wallboard industry. Cellulosa och Papper, SPCI 1908-1948: 232-42 (1948). [In Swedish; English summary]

As far as known the first wallboard factory was started in the United States in 1911 by the Minnesota & Oregon Paper Pulp Co. which made Insulite at International Falls. In 1926 Mason invented the Masonite process which soon spread over the world. The first wallboard mill in Sweden started operations in Nordmaling in 1929; it employed the Masonite process. Today, Sweden has 13 wallboard factories with a capacity of about 270,000 tons of hardboard and insulating board. The equipment and process employed in each mill are briefly described. Statistical data for the Swedish production from 1929 to 1947 inclusive are tabulated. A brief review of the wallboard industry in other countries is given and the present market situation is discussed. E.S.

BOARD MILLS

ANON. A pioneering mill: Southern Paperboard is success. Pulp & Paper 22, no. 13: 42-4, 47-50 (December, 1948); *cf.* B.I.P.C. 19: 5.

The new Port Wentworth, Ga., mill of Southern Paperboard Corp., the first in the South to be conceived, designed, and entirely constructed to run combined soft- and hardwood pulping operations, has been averaging 400 tons a day, and sometimes reaching 504 tons a day, proof of its success. An illustrated review is given of some of the outstanding features of the mill, including the refining room layout, washing and screening, the paper machine, wood handling, the recovery plant, and the power plant. R.R.

BOARD SPECIALTIES

ANON. Carry-home beer. Modern Packaging 22, no. 4: 116-19 (December, 1948).

An illustrated description is given of multiple-unit carry-home containers for bottled or canned beer. One is a sturdy corrugated container for a dozen cans, with a patented paperboard handle which locks into slots at each end of the package. The specially processed fiber handles are shipped separately and are not used when the cases are opened at the retail outlet. Another carry-home pack is a "break-apart" corrugated carton, perforated around the middle to facilitate separation into two 12-can packages. A paperboard package with a die-cut handle extending above the top closing flaps has received good buyer response. The carton construction permits the handle to be folded down beneath the top flaps to facilitate display stacking. Four cartons fit one of the regular corrugated shipping cases for 24 bottles, eliminating the need for dividers. Several companies have adopted the low-cost chipboard Autovidor, die cut in one piece and incorporating an interlocking construction so that it can be shipped flat and quickly set up by hand. An integral handle formed of two flaps extends from the center of the carrier after it has been set up and replaces the corrugated dividers customarily used in shipping cases. R.R.

BOARD TESTING—PHYSICAL

HRUBESKY, C. E. Comparison of several freeness testers on board stock. Tech. Assoc. Papers 31: 379-88 (1948); U. S. Dept. Agr. Forest Service, Forest Products Lab. Rept. no. R1719 (February, 1948).

In co-operation with the Raw Materials Testing Subcommittee of TAPPI Structural Fibrous Materials Committee, a comparison of five freeness testers was made on structural board stocks. Using a (1) Schopper-Riegler (regular), (2) Schopper-Riegler (modified), (3) Canadian Standard, (4) Oliver, and (5) Fir-Tex tester, values were obtained on a free, normal, and slow stock from each of seven board manufacturers. With the Fir-Tex tester, tests were made at 60 and at 108° F. to determine the weight of each stock required to reduce the flow of water from 0.75 to 0.10 gal./min. when pulled through the pulp pad by a 20-foot water leg. With the other testers, values were obtained with each of the stocks at 60, 80, and 100° F. using test specimens equivalent to 0.13, 0.5, 1.0, 1.5, and 2.0 grams moisture-free stock/sq. in. of screen area. The results shown in tables and curves indicate that no exact correlation exists between the freeness values obtained by the different instruments used. The Schopper-Riegler (regular) and Canadian Standard testers are in close agreement for most stocks but show wide variations with other stocks. The differences shown between free, normal, and slow stocks are not so great with these testers as with the Schopper-Riegler (modified) and the Fir-Tex testers. The Oliver tester indicates wide differences in the freeness values of some free, normal, and slow stocks, but only slight differences in these values for other stocks. No attempt was made to correlate freeness of a stock with its running properties on a machine. With any individual furnish on a single machine, a close relationship should exist between freeness determined by any method and the running properties. With different furnishes on one or different machines, it is believed that a value based on drainage time or weight of pulp required for constant change in drainage rate might give a closer correlation than values based on the divided-funnel type instruments. E.S.

LATHROP, E. C., and NAFFZIGER, T. R. Evaluation of fibrous agricultural residues for structural building board products. I. Methods and equipment. Paper Trade J. 127, no. 27: 53-60 [T.S. 540-5] (Dec. 30, 1948); Tech. Assoc. Papers 31: 337-43 (1948).

The equipment and methods used at the Northern Regional Research Laboratory for evaluating fibers for structural board manufacture are described. A Schopper-Riegler freeness tester, with a modified orifice of 0.156-inch diameter and using pulp at 0.4% consistency, gives duplicable results on free and slow pulps and has a practical range. Comparison of physical properties between laboratory boards and commercial boards or 3 × 3 feet experimental boards made from the same pulps, respectively, is shown to be quite close. With sufficient study it is possible to develop a factor between the strength values of small boards and a commercial board machine so that a close prediction of commercial operation may be arrived at in the laboratory. Data are presented showing the relationship between the moisture content of the board entering the drier and physical properties of the board. Density and strength factors increase with decreasing moisture content. By blending increasing proportions of hydrated pulp, the strength of the board at the same moisture content may be increased. The impact strength of commercial wood pulp insulating boards is low in comparison with boards made from bagasse or wheat straw. This is shown to be caused by the long tough fibers which may be produced from residues. It is suggested that wood fiber boards could be increased in impact strength by the incorporation of properly refined wheat straw or bagasse long fibers. This is the first of a series of papers relating to the fundamental fiber properties of agricultural residues as related to structural board manufacture. E.S.

CELLOPHANE

ANON. Vancouver bag plant expands cellophane division. Western Pulp and Paper 1, no. 5: 18-20 (December, 1948).

A description is given of the development of Bartram Paper Products Co. Ltd., Vancouver, the largest Canadian paper bag manufacturer west of Toronto. Among the new machines installed in the recently opened extension are a large Meisel five-color press and a Heinrich-Cottrell four-color aniline press for use with cellophane. R.R.

CELLULOSE—HEMICELLULOSE

GIERTZ, HANS WILHELM. The relationship between the properties of the pulp and those of the paper manufactured from it. Cellulosa och Papper, SPCI 1908-1948: 417-28 (1948). [In Swedish; English summary]

The intimate relationship between the properties of paper and the hemicellulose content of the pulp is well known. However, it is questionable if the hemicellulose, from a chemical point of view, exhibits papermaking properties which are specifically different from those which characterize pure cellulose. It seems more reasonable to assume that the effect of hemicellulose is a physical one and is caused by the amorphous parts of the fiber wall. This is illustrated by the fact that the amorphous parts produce a swelled cellulose gel on beating more readily than components of a highly geometrical order. The percentage of carbohydrates of a low packing density appears to be of great importance with regard to the ease of beating and the resulting paper properties. Pulps which contain large amounts of amorphous cellulose will beat easily and give papers of high density, resulting in high tensile and bursting strength, since these qualities depend upon the degree of bonding between the fibers. Greaseproof pulp is an example of this kind. Soft types of paper, having high bulk and porosity, low strength, and high opacity, are obtained from pulps poor in amorphous cellulose. Bleached kraft pulps as well as sulfite pulps refined by an alkaline treatment belong to this type and, although difficult to beat, improve the strength and, particularly, the permanence of strength and color. In this respect a striking resemblance to cotton rags exists. The tearing strength depends largely upon the inherent strength of the fiber and, especially, upon the thickness of the fiber wall. A high percentage of summerwood will produce a high tear of the pulp. It is not possible to improve the tear and burst factors simultaneously in a given pulp, the improvement of one property resulting in a decrease of the other. A combination of high tear and burst can be obtained only through suitable wood selection. Quick-growing wood species with a high percentage of summerwood and long fibers, as the southern pines, will give an extremely high tear, but poor burst. The growth of the Scandinavian conifers is favorable for the production of pulps which show simultaneously a high tearing and bursting strength. 38 references. E.S.

JAYME, G., and NIKOLIEW, N. The reactivity of hemicelluloses in pulps on xanthation. Angew. Chem. A 60, no. 1: 15-18 (January, 1948). [In German]

Three pulps of very different reactivities were studied: (I) a sulfate pulp used in papermaking, containing 9.1% mannan and 8.7% pentosan; (II) a sulfite dissolving pulp containing 6.8% mannan and 4.5% pentosan; and (III) a very reactive sulfite dissolving pulp containing 5.8% mannan and

1.9% pentosan. The hemicelluloses were shown to be far more readily xanthated than was cellulose and entered solution first. Mannan was less reactive than were the pentosans. Of the three pulps, (I) was extremely unreactive and its xanthated solutions were difficult to filter; (II) was of intermediate reactivity and its viscose solutions filtered well; (III), despite its very high reactivity, presented marked filtration difficulties. Residues obtained from partially xanthated pulps retained relatively small amounts of the hemicelluloses (especially pentosans). The authors give detailed analyses, including the so-called "U. F. values" (insoluble residues, *cf.* B.I.P.C. 17: 578-9) of (I), (II), and (III). These are determined by treating the alkali cellulose (using 4.25 grams of pulp on the ovendry basis) with 0.5 cc. carbon disulfide, thereby obtaining partial xanthation. The U. F. residues from such determinations are calculated on the basis of ovendry, hemicellulose-free α-cellulose. Mannan determinations were made by a modification of the Hägglund-Bratt method, which is fully described. The authors ascribe the varying reactions of the pulp largely to morphological-topochemical differences. 18 references. L.E.W.

CELLULOSE ESTERS—NITROCELLULOSE

CAMPBELL, H., and JOHNSON, P. Interaction between cellulose nitrate in solution and inorganic salts. J. Polymer Sci. 3, no. 5: 735-49 (October, 1948).

The authors confirm the fact that certain cellulose nitrates in 1% acetone solution become more viscous and finally gel on standing over calcium or lead oxide, the basic salts of weak acids and strong bases, and certain other materials. The gels, whose formation was facilitated by increased temperature, were broken by the addition of a small amount of acid. The rate of gelling increased with the nitrogen content of the cellulose nitrate, indicating that residual hydroxyl groups were not involved. The rate of gelling was enormously increased when carboxyl groups were artificially introduced into the cellulose before nitration. Gelation is, therefore, most probably caused by the cross-linking of different cellulose nitrate chains through carboxyl or, possibly, sulfo groups. Dilute (0.2%) cellulose nitrate solutions on standing over calcium oxide showed a fall in viscosity with time. This was shown by ultracentrifugal examination (of the calcium and lead oxide-treated solutions) to be caused by association processes leading to the formation of aggregates of higher sedimentation constant and molecular weight; degradation of the cellulose nitrate chains was not involved. Sedimentation constants corresponding to molecular weights of several millions were observed for a cellulose nitrate of initial molecular weight of approximately 100,000. Untreated control solutions showed no change in the state of aggregation. The association processes followed an approximately first-order law at room temperature and were more rapid with an increase in temperature. After sedimentation, the association products could not be redispersed. Calcium introduced into cellulose nitrate before solution in acetone did not cause association or any other noticeable effect at low concentration. 17 references. E.S.

JULLANDER, INGVAR. Concentration dependence of sedimentation constant for nitrocellulose. J. Polymer Sci. 3, no. 5: 631-4 (October, 1948).

An empirical method of correcting the sedimentation constant of high polymers for its concentration dependence is proposed. It should be possible to determine the sedimentation constant at infinite dilution with reasonable accuracy from experiments at concentrations where reliable measurements can be made. E.S.

CELLULOSE ETHERS

GRUNTFEST, I. J., and GAGLIARDI, D. D. The modification of cellulose by reaction with formaldehyde. Textile Research J. 18, no. 11: 643-50 (November, 1948).

Experiments relating to the chemistry of the technologically important cellulose-formaldehyde reaction are described. Although for many reasons definitive statements about the reaction cannot now be given, certain of its gross features are revealed. As the formalization process is usually carried out, the reaction with cellulose is competitive with the evaporation of the formaldehyde. At low temperatures (to 30° C.) no reaction takes place. At higher temperatures (150° C.) reaction takes place over a wide range of conditions of acidity. The product formed at high acidity is stable to hydrolysis and is characterized by reduced swelling, increased elastic modulus, and resistance to creep. At lower acidities and under alkaline conditions, the properties of the product are much more like those of the starting material and the formaldehyde is easily removed by washing in neutral aqueous solutions. The combining weight of formaldehyde with cellulose varies, among other things, with the concentration of the formaldehyde applied. The lower the concentration the more nearly the combining weight approaches 12, which corresponds to the formation of simple methylene ethers with the cellulose. At higher concentrations, the combining weight increases toward a value of 30, indicating the formation of polyoxymethylene ether linkages. 12 references. E.S.

TIMELL, TORE. Investigations on cellulose reactions. IV. The methylation of regenerated cellulose with methyl sulphate and alkali. Svensk Papperstidn. 51, no. 21: 509-12 (Nov. 15, 1948). [In English; German and Swedish summaries] *cf.* B.I.P.C. 18: 823.

The investigation of the methylation of native cellulose (*cf.* B.I.P.C. 18: 741-2) has now been extended to regenerated cellulose (viscose rayon) and the distribution of the methyl groups has been completely determined in the same way as previously described (*cf.* B.I.P.C. 18: 506-7). Five samples were prepared, the degree of substitution (D.S.) ranging from 0.33 to 1.75. As expected, the methylation took place somewhat more rapidly than with cotton linters. The distribution of the constituents was in the same order as before—that is, greatest on carbon 6, next on the secondary carbons 2 and 3 together, and then complete substitution of carbons 2, 3, and 6, but without substitution on carbon 3 alone or on carbons 2 and 6 or 3 and 6. With the regenerated cellulose, however, some substitution on carbon 2 alone was found and, also, the proportion of disubstituted units was lower and that of the trisubstituted units was much higher than expected. The possible causes of this are briefly discussed. Since regenerated cellulose is characterized by a greater proportion of amorphous material and greater accessibility of the hydroxyls, the inference from the results obtained is that, in the amorphous as well as in the crystalline areas, a substituent in a glucose residue makes the neighboring units in adjacent chains more accessible, whereas the opposite part of the same glucose residue becomes less accessible, resulting in a distribution of the substituents between the 6 and the 2-3 positions as found. At the same time, however, the greater amounts of trisubstituted and smaller amounts of disubstituted units show that the transformation of di- into trisubstituted products probably takes place more easily in the amorphous regions. A striking fact is noted in the two samples with the highest degree of substitution. All the substituents added (0.22 per glucose unit) in going

from a D.S. of 1.53 to 1.75 apparently entered the secondary positions. The decrease in free glycol groups was also 0.22, indicating that all the added substituents entered glucose units where both the secondary hydroxyls were free. This decrease in reactivity of the primary hydroxyl group with higher degrees of methylation has also been noted by Mahoney and Purves (*cf.* B.I.P.C. 12: 177-8). 13 references. M.A.H.

CELLULOSE FILMS, TRANSPARENT

HILLS, A. C. Hand-wrap heat sealing. Modern Packaging 22, no. 4: 126-9, 186, 188, 190 (December, 1948).

The author gives time- and money-saving ideas applicable to hand wrapping, chiefly with plastic film. He discusses the wrapping of small packages, open-top trays, and soft goods, the sealing of bags, and the care of heat-sealing equipment. Illustrations are included. R.R.

CHEMICAL TESTING—WOOD—CELLULOSE

JAYME, GEORG, and SCHENCK, UDO. Rapid method for determining the cellulose content of poplarwoods. Das Papier 2, no. 17/18: 323-7 (September, 1948). [In German]

After discussing the time-consuming methods used in determining "pure cellulose," the authors suggest the following technique for the indirect proximate determination of cellulose in poplars. A 100-gram sample (barked and chipped, and free from knots which lower the yield) is impregnated with 750 cc. of a liquor containing 2% sodium (65% as sodium hydroxide, 20% as sodium carbonate, and 15% as sodium sulfide) and given a kraft cook under carefully controlled and standardized conditions. For a specific wood sample, the pulp yields are sharply reproducible (within ± 0.12% of the wood). In the case of various *Populus* species, kraft pulp yields varied from 51-62%. Pulp samples contained on the average 0.75% ash, 0.8% extractives, and 1.2% lignin, and gave rise to about 12.5% furfural. On the basis of older analytical data, it is assumed that the pulp yield exceeds the true cellulose content by about 11% (the actual range is 7-12%). Thus a kraft pulp determination is made in place of the tedious determination of cellulose. As an example, a sample of *Populus monilifera* gave a 58.6% pulp yield and a calculated cellulose content of 47.6%. The "pure cellulose" by actual determination was 49.9%. The method serves for differentiating rapidly between various poplar species, showing those that are high, intermediate, and low in the percentage of cellulose. The adverse effects of knots in wood samples are discussed. 17 references. L.E.W.

CHLORINE

CHEMICAL ENGINEERING. Chlorine-caustic soda. Chem. Eng. 55, no. 12: 136-9 (December, 1948); *cf.* abstract below.

A pictured flowsheet is presented of the operations in the new Houston, Texas, caustic-chlorine plant of the Diamond Alkali Co., which is now turning out chlorine, 50 and 73% caustic solutions, and hydrochloric acid. E.S.

HIGHTOWER, J. V. Chlorine—caustic soda. Chem. Eng. 55, no. 12:112-16 (December, 1948); *cf.* B.I.P.C. 19: 234.

An illustrated description is given of the installations in the new Houston, Texas, plant of the Diamond Alkali Co. with a rated capacity of 220 tons of chlorine per 24 hours. E.S.

CHROMATOGRAPHY

FLOOD, A. E., HIRST, E. L., and JONES, J. K. N. Quantitative analysis of mixtures of sugars by the method of partition chromatography. Part I. Standardisation of procedure. J. Chem. Soc.: 1679-83 (October, 1948); *cf.* B.I.P.C. 18: 362.

A detailed description is given of the technique for the separation and determination of sugars (total weight about 0.1-1.0 mg.) on the paper chromatogram, as mentioned in the previous reference. The accuracy has been previously reported as ±5% but, with greater experience, it has been found possible to work to accuracies of ±2%. E.S.

CLAY

HARRINGTON, E. R. Colloid properties of some western clays. J. Phys. & Colloid Chem. 52, no. 8: 1373-82 (November, 1948).

The present investigation was carried out over a period of about 10 years, using three California pottery and stoneware clays and 12 New Mexico clays of various types in an attempt to evaluate the reliability of various methods of determining their colloid content. The conclusion was reached that the use of hydrometers, viscometers, the adsorption of various substances, base exchange, heat of wetting, plasticity, sedimentation, ion migration, etc., gives qualitative rather than quantitative results. The clay particles are evidently highly selective in their nature, and each clay must be studied individually. The properties of adsorption are more dependent on molecular arrangement in crystalline particles than on size of aggregation. Some clay minerals are easily broken up by water, going into a state of aggregation in which a large percentage of the particles can be recovered by various sedimentation and extraction means. Other clay minerals cannot be easily broken down into small particles which can be so recovered. Sedimentation and extraction methods will list these clays as low in colloid content and yet, owing to their cellular structure, the material judged as noncolloidal may exhibit many of the properties usually assigned to a colloidal material. Multiple extractions of colloid material, such as the 15-day method used as a standard in the present work, are judged to be superior to shorter methods for determining standards for comparison, although still leaving behind material which exhibits colloidal properties. 29 references. E.S.

COLOR

DAY, FREDERICK T. Colour and your product. Brit. Packer 10, no. 11: 19-20 (November, 1948).

The author outlines ways in which color may be used, not only in labeling and packing, but also for business stationery. It is suggested that many old austerity labels should be redesigned, and that advantage should be taken of the better papers again on the market. A few colors and shades are listed with the impressions they give and the products for which they are suitable. R.R.

WRIGHT, W. D. The limitation of color—Part IV. The effect of top-surface reflection. Rayon and Synthetic Textiles 29, no. 11: 92-4; no. 12: 91-2 (November, December, 1948); *cf.* B.I.P.C. 17: 691.

The present article is concerned with the effect of top-surface reflections

on saturation of color. Since top-surface reflection is not modified by absorption, it usually assumes the color of the illuminant and tends to dissaturate the color of the surface as a whole. The author has calculated the shift in saturation produced by various percentages of top-surface reflections and body-color reflections. He demonstrates that a much greater shift in saturation results with a saturated body color than for a desaturated body color for a given percentage of top-surface reflection. O.H.O.

CONTAINER INDUSTRY

ANON. Pre-packs. Modern Packaging 22, no. 4: 93-8 (December, 1948).

In department store operation, prepacking means that merchandise is packed in selling units by the manufacturer so that it can be carried through the store to the home in the same container without repacking. Because the more obvious advantages are in favor of the retailer rather than the manufacturer, progress in this field has been hampered by the question of who should pay the cost of the prepacks. The ideal procedure would be to have prepacks engineered and planned scientifically, with the cost included by the manufacturer in the wholesale selling price of the item. Although some large manufacturers are doing this, there must be greater co-operation through intrastore committees. R.R.

MODERN PACKAGING ENCYCLOPEDIA. Packaging in specialized fields. Modern Packaging Encyclopedia, 1949: 33-112 [New York, Packaging Catalog Corp., c1948].

Packaging is discussed and illustrated descriptions are given for various commodities as follows: Graf, George N. Bakery goods, p. 34-8; Claassen, Ralph I. Beverages, p. 39-42; Hassler, W. Scott. Confectionery, p. 43-9; Schusler, Ralph. Toilet goods, p. 50-3; Fisher, G. Norwood. Dairy products, p. 54-7; Munson, Charles E. Drugs, pharmaceuticals, chemicals, p. 58-64; Toof, F. Leslie, and Easter, Ross A. Grocery products, dry, p. 65-9; Miller, F. J. Grocery products, liquid, p. 70-3; Brackett, A. B. Frozen, dehydrated, pre-packaged foods, p. 74-8; Funke, A. H. Canned fruits & vegetables, p. 79-82; Pollock, M. C. Meats, poultry, fish, p. 83-6; Boehmer, Marguerite S. Jewelry & novelties, p. 87-90; Fletcher, G. M. Hardware, tools, p. 91-4; Reed, R. Chester. Paints, oils, lubricants, inks, p. 95-8; Schuchard, Carl V. Tobaccos, smokers' articles, p. 99-102; Holtz, F. R. Cameras, games, toys, p. 103-7; Martinus, Stanley A. Textiles, wearing apparel, p. 108-12. R.R.

CONTINUOUS COOKING PROCESS

GOODWIN, R. G. Further progress in continuous pulping. Tech. Assoc. Papers 31: 445-7 (1948).

The present work was undertaken in order to compare straw pulps suitable for 9-point corrugating made by three distinctly different methods: rotary digester, low pressure (I), Chemipulper-Defibrator, high pressure (II), and Morley continuous pulper using atmospheric pressure (III). The test data obtained to date indicate that the continuous cooking of straw in (II) will make a pulp equal to that now produced in (I) for 9-point corrugating. (III) using steam, chemical, and atmospheric pressure is able to make a 9-point corrugating pulp which has better strength properties than that obtained with either (I) and (II). The good stiffness characteristics of straw pulp made in (III) make it possible to use a high percentage of

waste papers in the furnish of the board, and this same pulp may be used in tube stock and other furnishes where rigid characteristics are essential. E.S.

CORROSION

NOX-RUST CHEMICAL CORPORATION, *Chicago.* Loosely-wrapped parts store without rust. Chem. Processing Preview 11, no. 11: 34-5 (November, 1948).

Nox-Rust Wrapper is a neutral kraft paper treated with a synthetic chemical and is used for the wrapping of saw blades, bearings, knives, sheet steel, bar stock, etc. Very slow vaporization of the chemical passivates the surface of the metal and prevents the corrosive action of moisture and oxygen in the air. It is effective, even though the paper itself is not in contact with the metal and remains effective for an indefinite period of time. However, the metal should be packaged immediately after the final cleaning operation. The vapor is odorless, nontoxic, and not injurious to the skin. The wrapper is used without sealing in the same manner as any other ordinary kraft paper employed for packaging. When the package encounters cycling humidity and temperature changes during storage and shipping with moisture condensation resulting upon the metal surface, the chemical vapor in the air enclosed in the package is dissolved in the water, thereby preventing corrosive activity. E.S.

WACHTER, A. Vapor-phase inhibitors. Modern Packaging 22, no. 4: 147-8 (December, 1948); *cf.* B.I.P.C. 19: 155.

One of the most recent developments in protective packaging utilizes a wrap or container incorporating a slightly volatile corrosion inhibitor known as VPI, now available from paper-converting licensees of the Shell Development Co. The VPI vaporizes slowly from the coated paper and makes condensed or adsorbed moisture on steel incapable of rusting; it does not react with or remove the water or oxygen, affect pH or acidity, and is not consumed by its protective action. One gram of VPI vapor at room temperature saturates 16,000 cu. ft. of air. If a single-layer wrap is desired, and no carton is used, the VPI-coated paper must have barrier coating or laminant to hinder the escape of the inhibitor. Under severe temperature and humidity conditions, protection could be obtained for about one month with a 30-pound kraft VPI paper as the sole wrap; with an overwrap of plain 60-pound kraft, protection would last for six months; with a waxed kraft overwrap, four years; and with a foil-paper laminated overwrap, more than five years. Simple fold closures secured by string or gummed tape are adequate for one or two years, provided no gaping openings are left. To secure the optimum duration of protection from foil barrier wraps, a tighter closure is necessary but hermetic sealing is probably not required. With paperboard or corrugated carton packaging, the inner VPI wrap may be eliminated and a preformed loose case liner of VPI paper may be used, or the paper may be laminated to the interior of the box. Envelopes or bags of VPI paper are both successful and simple to use. The major guiding principles for the effective use of VPI are that the coating should be relatively close to the metal to be protected and that the air which enters the finished package should be compelled to pass through or over the VPI coating before reaching the metal surfaces. R.R.

WESTWOOD, W., and HIGGINS, R. I. The corrosion of ferrous metals. Paper-Maker [London] 116, no. 5: TS 47-53 (November, 1948).

A brief account is given of the more salient features of corrosion likely to be encountered in the papermaking industry. The problem can be considered from the point of view of either the metal or its environment, the latter having a much greater effect on the rate of corrosion than the metal itself. The environment regulates the amount of trouble encountered. The two main sets of circumstances in which ferrous metals are exposed to corrosive influences are exposure to the atmosphere (chiefly moisture and sulfur dioxide) and exposure to liquids (dissolved oxygen, dissolved metals, dissolved salts, stray currents, temperature, rate of flow, and impact). The effect of corrosion (rust formation, pitting, solution, and graphitic corrosion) is described briefly. The methods of protection (changing the composition of the metal; modifying the environment, including inhibitors and cathodic protection; and protective coatings) are discussed and a few illustrative corrosion problems experienced in the paper industry are outlined. In conclusion, it is pointed out that each corrosion problem has its own individual features and that a satisfactory solution can be attained only by considering all the aspects of the particular problem. 9 figures. E.S.

COTTON

HESSLER, LYLE E., SIMPSON, MARION E., and BERKLEY, EARL E. Degree of polymerization, spiral structure, and strength of cotton fiber. Textile Research J. 18, no. 11: 679-83 (November, 1948).

Cotton fiber from bolls collected on opening and dried in the laboratory without exposure to direct sunlight were tested for the following fiber properties: fiber length, fineness, strength, spiral structure, and D.P. When these individual properties were each correlated with the Pressley strength index in simple correlations, the spiral structure and Pressley strength index gave the highest r values, and the D.P. and Pressley index the second highest. For variety effects, the D.P. and Pressley index gave a higher coefficient of correlation than the spiral structure and Pressley index. Significant r values were obtained between fineness and Pressley index for total and variety effects, between fineness and D.P. for all effects, and between spiral structure and D.P. for all effects. Furthermore, a significant r value was found when fiber length was correlated with chain length (D.P.) for total over-all effects. It is concluded that the length of the cellulose molecule (D.P.) is an important factor in the physical properties of cotton fibers. All multiple correlations, including the fiber properties used in the simple correlations, were highly significant for varieties within locations and for over-all effects. Spiral structure and chain length (D.P.) when correlated with Pressley strength gave the highest coefficient of correlation. 18 references. E.S.

DE-INKING

BAILEY, H. P., NADELMAN, A. H., and ANDREWS, E. F. Deinking studies. III. Survey of a production system by screen analysis. Paper Trade J. 127, no. 23: 63-6 [T.S. 504-7] (Dec. 2, 1948); Tech. Assoc. Papers 31: 265-9 (1948); *cf.* B.I.P.C. 17: 692.

A screen analysis, made with a pulp classifier and supplemented by other pulp tests, was used to survey and evaluate a deinking system. The results showed that 77% of deinking and defibering was accomplished during the initial disintegration and only 21% during subsequent cooking. Practically all the fines in the system were either present at the start of deinking or introduced with the white water or may have resulted from the delignification of coarse fiber bundles. Mechanical action did not produce any significant portion of fines. Effluents diverted to the white water system for re-use were those richest in medium and fine portions of fibers and lowest in ash

content. The waste effluent had the lowest medium and fine portions of fibers and the largest ash content. E.S.

HEUER, J. H. Deinking waste papers with sodium peroxide. Paper Trade J. 127, no. 24: 25-6 (Dec. 9, 1948); Fibre Containers 33, no. 12: 136, 138 (December, 1948); Paper Ind. 30, no. 10: 1530, 1532 (January, 1949).

Reference is made to the advantages of the sodium peroxide process for deinking waste papers containing large amounts of groundwood stock. The waste paper, after treatment in a hydrapulper or other type of defibering equipment with a solution containing an alkali and sodium peroxide, is subjected to a mild cook. One of the most important results of the process is the greater uniformity in the brightness of the pulp obtained. E.S.

DYES AND DYEING

PETERS, R. H., and VICKERSTAFF, T. The adsorption of direct dyes on cellulose. Proc. Roy. Soc. (London) 192A: 292-308 (1948); J. Textile Inst. 39, no. 4: A197 (April, 1948). [Abstract only available]

Theories of the adsorption of direct dyes on cellulose do not provide a satisfactory measure of the affinity of a direct dye for cellulose. A conventional thermodynamic treatment is shown to fit the experimental data on both Chlorazol sky blue FF and Chrysophenine G very well over a wide range of dye and salt concentrations and temperatures. The method has the advantage of simplicity as compared with previous treatments and, furthermore, leads directly to numerical values for the affinity and heat of reaction of direct dyes on cellulose. The main defect of the method arises from the introduction of an arbitrary volume term (representing the volume of a layer of solution next to the actual cellulose/water interface which shall contain all the variations in ionic concentrations near the interface), and the significance of this term is discussed. The adsorption of a number of dyes on viscose rayon has been examined and it is shown that the actual affinity will be largely dependent on the salt concentration in the dye bath and the effect will be greatest with dyes having a high charge. A study of the adsorption of Benzopurpurin 4B (a dye of low charge and high affinity) on cotton showed that dyeing still occurs in the absence of a foreign electrolyte. This behaviour suggests that in cotton there are a small number of sites for which the dye has high affinity; when these are saturated, dyeing on the more plentiful but less active sites occurs. E.S.

ESPARTO

REID, J. Some contributions to the history of esparto. Paper-Maker (London) 116, no. 5: 265, 267-70, 261 (November, 1948); Paper Making and Paper Selling 67, no. 3: 46-52 (Autumn, 1948).

The author attempts to answer the two questions: (*a*) what led Routledge to choose such a suitable raw material as esparto for his experiments and (*b*) why was its use developed to a greater extent in Scotland than in England. The material on the subject and on the life of Routledge is scanty, Routledge himself having written nothing about it. Esparto was known from very early times, Horace mentioning it as the material from which slave whips were made. It was used for textiles, mats, baskets, soles, upholstery, ropes, cordage, packing for oranges, etc. A study of the patent literature on esparto disclosed that there existed many British and foreign

patents on its possible use as a papermaking material before Routledge's time, although it is not known for certain whether or not they were ever practiced in any paper mills. Routledge got his first patent in 1856 and he deserves the credit for making esparto paper a success. The first mill to use the new material was Cowan's at Penicuik in 1861, and after that time imports of esparto went up by leaps and bounds. About the year 1875, Routledge got the impression that esparto was gradually being exterminated by the natives who gathered it and that complete exhaustion was to be expected. He started experiments on bamboo. However, the shortage he feared did not take place and developments in wood pulp prevented bamboo from receiving attention at that time. Routledge died in 1887 in London. A number of reasons are given why Scotland took such a prominent part in the development, such as the repeal of certain taxes, excellent shipping facilities from Spain to Glasgow and Leith, available funds for machinery and plants, availability of the required chemicals and cheap coal, enterprise of the Scottish mills, etc. In conclusion, brief synopses of esparto patents other than Routledge's and those of Routledge are given. E.S.

FEED WATER

GHOSE, M. K. Feed water and boiler scales. Indian Pulp and Paper 3, no. 3: 119-23, 131 (September, 1948).

The author discusses the substances commonly found in water, the soap test for determining the hardness of water, tests for alkalinity, acidity, and pH, and methods of treatment for various undesirable conditions. R.R.

FIBER—TESTING

PHILLIPS, J. K. Laboratory techniques. A modification of the flat-bundle test method for testing cotton-fiber strength. Textile Research J. 18, no. 11: 684-6 (November, 1948).

A new testing technique is described which permits the use of the Pressley fiber jaws on the Scott I P-4 tester to measure the tensile strength of cotton fiber. This method also makes it possible to test the flat bundle at different test-specimen lengths or jaw spacings. Some data are included which show the effect of increase of test-specimen lengths on the tensile strength of cotton fiber and other textile fibers. E.S.

REES, W. HOWARD. The over-all specific volume, compressibility and resilience of fibrous materials. J. Textile Inst. 39, no. 4: T131-41 (April, 1948).

A method for measuring the over-all specific volume, compressibility, and resilience of fibrous materials (cotton, wool, milkweed, kapok, silk, nylon waste, and viscose and acetate staple fiber) is described; experimental data for certain fibers are presented. The apparatus used was a modification of that employed in earlier studies with kapok (*cf.* B.I.P.C. 17: 293-4). The changes in the instrument and the testing procedures are outlined. The results indicate that the over-all specific volume of fibers in bulk depends on their previous treatment, even though the fibers are oriented as indiscriminately as possible before the measurement is carried out. It is also shown that, in measurements of resilience, the use of a hollow rigid cylinder for holding the fibers should be avoided, since it leads to error on account of friction between the fibers and the cylinder wall. E.S.

FOLDING BOXES

ANON. Cake suggestions. Modern Packaging 22, no. 4: 140-1 (December, 1948).

Illustrated descriptions are given of decorated cake boxes used by the Great Atlantic and Pacific Tea Co. to increase sales for holidays and other special occasions. Cellophane-window cartons are used which give a two-dimensional view of the cakes. The idea has proved successful enough to warrant an increase in the number of carton designs. R.R.

ANON. Carton is the salesman—package effects new candle merchandising. Am. Boxmaker 37, no. 12: 14-16 (December, 1948); Shears 66, no. 672: 25, 30 (December, 1948).

Emery Industries, Inc., Cincinnati, has adopted a unit package to hold four candles for the retail trade. A die-cut, flame-shaped, cellophane window allows the candles to be seen and, with the different colors thus visible, offers an effective mass display. A frame from which candles are suspended facilitates selection of the desired color, size, and style without unnecessary handling of the other merchandise. Trial marketing of the new pack has been very successful. The reverse tuck outer carton is used over a slide tray insert, with a pleated liner for added protection. R.R.

ANON. Extension-edge folding box. Modern Packaging 22, no. 4: 132-3 (December, 1948).

An illustrated description is given of two special combination packages which combine the economy and convenience of a folding box with the quality appearance of an extension-edge base. Both the cover and base are made of a one-piece board blank with one side glued. They are shipped in flat bundles to effect an important saving in storage and can be set up and handled as quickly as set-up boxes. A die-cut interior bracing of the cover, which helps to hold the contents in place during shipping, is actually an extension of one side wall. R.R.

FORESTS AND FORESTRY

KOROLEFF, A. Forest management and the people. Pulp Paper Mag. Can. 49, no. 12: 129-30, 132 (November, 1948).

The author discusses the urgent need for intelligent public relations between foresters and the population in Canada and gives suggestions for attaining this goal. The average layman, in general, is quite hazy about forestry matters, most of his concepts deriving from hastily concocted articles in the press chiefly concerned with sensational news items. Obviously, foresters themselves should be the main source of sound information for the masses. The author selects the small woodlot owner and farmer as an example to show what could and should be done before it is too late. E.S.

PRIAULX, ARTHUR W. New seeding tool speeds reforestation. Western Pulp and Paper 1, no. 5: 28-9 (December, 1948).

Members of the Oregon State Department of Forestry have devised a direct-seeding tool which is described and illustrated. It is shaped like a walking stick, the main stem of which holds the mechanism and the seeds. One end is split and flattened to form a blade. A thrust rod inside the stick is connected to a tripper on the handle. At the lower end of the thrust rod is a feed outlet valve which permits 5 or 10 seeds to drop out. The seeder weighs only five pounds, holds half a day's supply of seed, and permits one man to seed three to five acres a day. The tool is not patented and may be made from drawings available from the Department. Labor for seeding with the tool will cost about $4/acre and seed $4 to $6/lb., which will seed four to eight acres. R.R.

RECKNAGEL, A. B. Sustained yield management. Western Pulp and Paper 1, no. 5: 22-4 (December, 1948).

By sustained yield management is meant the co-ordinated management of forest properties and industries for the continuous production of goods and services. The technical knowledge available is sufficient to maintain forests in a highly productive condition, but to do so and also assure the continuance of the many uses of the forest and its industries is much more difficult. To attain sustained yield management, property must first be organized, its values inventoried, and plans made for realizing the full productive capacity of the land. Multiple-product recovery is essential for the perpetuation of forests and forest industries. The author emphasizes the fact that integration of woods and mill practices is the key to log selection; woods production, mill operation, and sales management must work together for the solution of the industry's problems. R.R.

SYLVÉN, NILS. The improvement of forest trees. Cellulosa och Papper, SPCI 1908-1948: 155-73 (1948). [In Swedish; English summary]

The author discusses the possibilities of forest tree breeding based on heredity research and some of the results obtained in Sweden. An unnumbered bibliography of over four two-column pages is appended. E.S.

FUEL

ROSENBLAD, GÖSTA. The dew point of fuel containing sulfur. Cellulosa och Papper, SPCI 1908-1948: 406-16 (1948). [In Swedish; English summary]

With reference to the fundamental studies of Johnstone in the United States with high-sulfur coal and the raised dew point of such fuel caused by the sulfur trioxide in the flue gases, the author discusses Swedish experiences with fuel oil and sulfite waste liquor; difficulties with coal have thus far given no concern in Swedish boiler plants. An electric instrument for measuring the dew point was constructed, similar to that developed by Johnstone, and a number of measurements were carried out. In the case of fuel oil, a dew point of approximately 150° C. was determined; with sulfite liquor fuel, dew points in the neighborhood of 100° C. were found, representing a rise of about 45° C. The studies are being continued. E.S.

GUMS AND RESINS

BROWN, F., HIRST, E. L., and JONES, J. K. N. The structure of almond-tree gum. Part I. The constitution of the aldobionic acid derived from the gum. J. Chem. Soc.: 1677-79 (October, 1948).

Almond-tree gum on hydrolysis yields L-arabinose (4 parts), D-xylose (2 parts), D-galactose (3 parts), and D-glucuronic acid (1 part). On graded hydrolysis, the polysaccharide yields an aldobionic acid identified as 6-(D-glucuronosido)-D-galactose, since on methylation, followed by hydrolysis of the methylated derivative, 2,3,4-trimethyl-D-glucuronic acid and 2,3,4-trimethyl-D-galactose are produced. The structure of this aldobionic acid is identical with that of the aldobionic acids found in gum arabic and eggplum gum. E.S.

HARRIS, GEORGE C. Resin acids. V. The composition of the gum oleoresin acids of *Pinus palustris*. J. Am. Chem. Soc. 70, no. 11: 3671-4 (November, 1948); *cf.* B.I.P.C. 18:835-6.

The composition of the acid fraction of American gum oleoresin from *Pinus palustris* has been determined fully for the first time, using such techniques as the amine salt method, ultraviolet absorption spectrum technique, and the Diels-Alder addition of maleic anhydride. In addition to the already known levopimaric and dextropimaric acids and a dihydroabietic acid, the following acids were shown to be present as primary acids in oleoresin: neoabietic, abietic, isodextropimaric, and dehydroabietic acids. 16 footnotes. E.S.

HARRIS, GEORGE C., and SANDERSON, THOMAS F. Resin acids. VII. Isolation and structure of isodextropimarinal, a possible resin acid precursor. J. Am. Chem. Soc. 70, no. 11: 3870-2 (November, 1948).

The aldehyde of isodextropimaric acid, termed isodextropimarinal, has been isolated from the neutral fraction of both wood and gum rosins. Its identity was proved by oxidation with chromic acid, which gives a good yield of the pure resin acid. E.S.

HARRIS, GEORGE C., and SPARKS, JACQUELINE. Resin acids. VI. Kraft's proabietic acid, a mixture of primary resin acids. J. Am. Chem. Soc. 70, no. 11: 3674-5 (November, 1948).

Kraft's proabietic acid (*cf.* B.I.P.C. 7: 42) was found to be a mixture of the following primary resin acids: levopimaric, abietic, neoabietic, isodextropimaric, and others that do not demonstrate characteristic absorption maxima in the ultraviolet region and were not separated by the amine salt method. 10 footnotes. E.S.

HARD WOODS

ARIES, ROBERT S. The pulping of southern New England hardwoods. Tech. Assoc. Papers 31: 460-6 (1948); Northeastern Wood Utilization Council, Bull. no. 20: 1-26 (June, 1948); Paper Trade J. 128, no. 2: 21-6 (Jan. 13, 1949).

Pulping tests on typical mixed hardwoods, consisting of about 70% oak and beech, birch, maple, and hickory, indicate that they are especially suited for corrugating containers. The neutral sulfite semichemical process was found superior to the sulfate process for this purpose. The finished papers and boxes equal or surpass in their properties kraft paper made from southern pine. The transportation differentials and proximity of markets should make this project attractive. The Northeastern Wood Utilization Council has made a thorough survey of the hardwood area in Connecticut, southern New York, Massachusetts, and Rhode Island to find that they can amply support a large-scale pulping operation. Engineering plans are now under way for the erection of a paperboard mill in the area. A progress report is made on a process to solve the pollution by burning and re-using the brown liquors. E.S.

HISTORY

BOSAEUS, ELIS. At the time of the brothers Hanson. Cellulosa och Papper, SPCI 1908-1948: 20-34 (1948). [In Swedish; English summary]

This is a historical account of the activities of the two brothers Magnus and Nils Hanson, construction engineers, who built most of the sulfite mills in the Swedish province Norrland during 1900-1915. E.S.

GRIPENBERG, ADOLF. The training of a papermaker at the end of the last century. Cellulosa och Papper, SPCI 1908-1948: 35-41 (1948). [In Swedish; English summary]

When a young man in 1890 intended to become a paper-mill engineer in Sweden, he had to start as a common worker in a mill. The author describes his training at Wargöns paper mill. E.S.

HANSEN, SVERRE. The history of paper. Norsk Skogind. 2, no. 10: 264-9 (October, 1948). [In Norwegian]

The author traces the spread of the art of papermaking from its earliest beginnings in China to North Africa and Europe down to the invention of the paper machine, groundwood pulp, and chemical processes. A map is included. E.S.

HULTMAN, GUNNAR. SPCI's historical collection of documents on the pulp and paper industry in the archives of the technical museum. Cellulosa och Papper, SPCI 1908-1948: 42-8 (1948). [In Swedish; English summary]

In 1939, the Svenska Pappers- och Cellulosaingeniörsföreningen (SPCI, the Association of Swedish Pulp and Paper Engineers) started to collect documents and recollections from its older members in order to form the basis for the history of the technical progress of the industry. E.S.

INSTRUMENTATION

MCALEAR, JAMES M. Instrument applications in the sulphate mill. Pulp Paper Mag. Can. 49, no. 12:95-6 (November, 1948).

The author discusses control equipment for digesters, brown stock washers, and chemical recovery. E.S.

PEART, T. B. Lime kiln instrumentation. Pulp Paper Mag. Can. 49, no. 12: 91-4 (November, 1948).

The author discusses the important points which should be recorded and controlled to obtain efficient and trouble-free operation of a lime kiln; they include hood draft, burning zone temperature, fuel flow-air flow relation, exit gas temperature, intermediate temperatures, uptake draft, mud storage tank level, filter cake thickness, kiln speed, and oxygen content of gases leaving the kiln. The instruments used for this purpose are described. 3 diagrams. E.S.

SHOLL, H. A. Machine room instrumentation. Pulp Paper Mag. Can. 49, no. 12: 102-5 (November, 1948).

The author discusses some of the many control and measuring problems presented by the drying and finishing operations, including temperature control, machine speed measurement, sheet moisture measurement, machine room ventilation, space heating, constant humidity laboratories, and air-conditioned finishing and storage rooms, as well as pressure loading, liquid level and temperature control, bearing and cylinder temperature measurement, and gloss recording on calenders. Instruments and combinations of instruments and controls are available today which can satisfactorily solve the great majority of such problems facing the operator. However, a properly engineered system can only be obtained by the intelligent co-operation of the mill operator and the instrumentation engineer. 7 figures. E.S.

INSURANCE, FIRE

WRIGHT, W. G. Forest fire insurance in eastern Canada. Pulp Paper Mag. Can. 49, no. 12: 134 (November, 1948).

The possibilities of insuring the standing timber against fire losses are discussed. Such insurance has been in operation in Scandinavian countries for about 30 years; publications on this subject indicate that the problem in Canada does not differ considerably from the operation of this type of insurance in northern Europe. E.S.

JUTE

BASU, S. N. Fungal decomposition of jute fibre and cellulose. Part 1. A preliminary survey of commonly occurring species. J. Textile Inst. 39, no. 7: T232-7 (July, 1948).

Out of 69 commonly occurring species of lower saprophytic or mildew fungi (some of them not identified), a large proportion has been found able to grow well in pure culture, with filter paper or jute fabric as source of carbon. Among the rest, some gave a better growth on jute than on filter paper. The presence of starchy matter stimulates growth; many species may cause stain, and the staining activity may also be stimulated by starchy sizing and can be caused by species themselves unable to attack the cellulose. The species showing strong growth on jute and filter paper, as judged visually, actually have greater cellulose-decomposing capacity than others growing only moderately well on these substrates; this capacity, however, varies widely among the strong species themselves. Growth and cellulose decomposition naturally depend on a number of variable environmental factors of a physical, chemical, or biological nature. Tabulated data of quantitative cellulose decomposition are given for the 69 species investigated. 11 references. E.S.

BASU, S. N. Fungal decomposition of jute fibre and cellulose. Part 2. The effect of some environmental factors. J. Textile Inst. 39, no. 7: T237-48 (July, 1948).

In the second part of the article, the effects of temperature, pH, source of nitrogen, growth factors, and nature of the cellulosic substrate were studied. Most of the species showed maximum activity at 30° C. or higher and caused appreciable loss at 37° C.; *Stachybotrys atra* alone preferred a rather lower temperature. The optimum pH with all species was 5.8 or possibly even lower, and cellulose decomposition fell as the pH was raised; however, all species displayed wide powers of adjusting the reaction in an unbuffered medium through the production of acid or alkali. Considerable specificities were displayed toward the form of the nitrogen source, peptone and nitrate being assimilated most readily. A combination of six well-known growth factors of the vitamin B group had no effect on cellulose decomposition by the species under investigation. Jute appeared to be more resistant to decomposition than cotton, and cotton more so than filter paper, the relative attack rates of different species being different on these three substrates. When jute suffered decomposition, destruction of cellulose accounted for most of the weight loss, although some pentosan and lignin were lost. The comparative resistance of the jute fiber is probably caused by its lignin content, although a natural antibiotic may also play some part. Two organisms growing together on filter paper often dissolved less cellulose than the stronger one alone; this was caused by partial or complete suppression of one species by the other, which was not necessarily the stronger cellulose decomposer. Some species occurring on rotting jute

had little destructive action on jute in pure culture; in association with a strong cellulose decomposer, they sometimes stimulated or depressed cellulose decomposition. 18 references. E.S.

SARKAR, P. B. Jute fiber as a source of cellulose. J. Sci. Ind. Research (India) 7B; no. 2: 21-4 (1948); C.A. 42, no. 19:7524 (Oct. 10, 1948). [Abstract only available]

Jute fiber, having useful applications in the textile field, cannot be considered as an economical replacement for cotton linters as a source of cellulose. Waste jute or jute products, however, may be a valuable supplementary source of α-cellulose in India. Complete removal of lignin from jute fibers is easily achieved by treatment with 0.7% sodium chlorite at 100°, giving holocellulose; this, treated with 9.3% caustic soda at room temperature, gives α-cellulose of a quality suitable for the preparation of viscose rayon or cellulose acetate. E.S.

SARKAR, P. B., and CHATTERJEE, H. The bleaching of jute with chlorite. J. Textile Inst. 39, no. 8: T274-81 (August, 1948).

Jute is not commonly bleached and little is known about its chemistry of bleaching. Owing to the acute shortage of textiles during and after the war, satisfactorily bleached jute may have a future demand. Sodium chlorite seemed to be the most suitable bleaching agent and certain aspects of the process and the effects of various factors (time, temperature, pH, concentration of chlorite, and yarn/liquor ratio) have been studied. The results indicate that the structure and composition of the fiber have a very important bearing on the method to be employed. Jute contains about 11% of lignin which must be more or less completely removed in order to obtain a good white color. The ultimate cells of jute fiber are, on the average, only 2.5 mm. in length, and they appear to be cemented together by hemicelluloses, of which the fiber contains some 25%. These hemicelluloses are very susceptible to the action of alkalies or oxidizing agents. To avoid loss of weight or strength during bleaching, the removal of lignin and other colored substances from the fiber has to be carried out very carefully, so that the cementing material remains more or less unaffected. The processes employed for bleaching cotton, flax, or true hemp are, therefore, not applicable to jute. Even a very mild scouring prior to bleaching is highly detrimental to jute. Delignified jute was found to maintain its fibrous structure and also a very considerable proportion of its strength, when tested in airdry condition. To attain the best shade under given conditions, the natural fat and wax of the fiber have to be previously removed, because they form yellow compounds with chlorite during bleaching which are difficult to remove. For a reasonable wet strength and a fair degree of whiteness, no suitable conditions for bleaching with chlorite could be found. For a pale yellow color 0.5% chlorite at a yarn/liquor ratio of 1:10 and a temperature of 65-70°C. seems to be suitable. After-yellowing, which develops in partly and fully bleached jute, constitutes another serious drawback. Partially delignified jute turns yellow much more quickly than the fully delignified fiber; hemicelluloses rather than lignin decomposition products appear to be responsible for the development of the yellow color. 16 references. E.S.

KRAFT PULP AND PAPER

EVERY, DERNELL. Outlook for sulphate envelope paper supplies. Am. Paper Converter 22, no. 12: 13, 20 (December, 1948).

On the basis of figures for 1935-41, when a balance existed between supply and demand, it has been calculated that the demand for kraft paper

increases about 7.5% for a 10% increase in consumer income, giving a factor of 0.75. The coefficient for wrapping paper is also 0.75, for grocers' bag paper 0.26, for shipping sack paper 1.3, for asphalting paper 0.70, and for envelope paper 0.80. By the use of these figures, forecasts can be made to determine how much of such papers will be needed by the economy at any particular level of purchasing power. The current demand for 75,000 tons of envelope kraft is being met by only 86%, primarily because manufacturers definitely prefer to sell paper in jumbo rolls and concentrate chiefly on grades which can be sold in that form. It is estimated that the demand for envelope kraft will reach 77,100 tons in 1950. The problem of meeting this demand could be solved quickly if envelope manufacturers would install sheeting equipment and purchase stock in jumbo rolls. The gradual arrival at a balance between supply and demand in other grades will also help the situation. Much can be done by the converters' recognizing the manufacturers' trend away from finishing room operations. The author expects a return to normal in unbleached kraft envelope stock in 1949 if converters earnestly try to get more paper. R.R.

PIGMAN, W. W., and CSELLAK, W. R. A study of the origin of the kraft color. Tech. Assoc. Papers 31: 393-9 (1948).

Earlier studies of the nature and cause of the kraft color have been extended. In the present paper, further evidence is presented which indicates that the bulk of the color is derived from lignin. The brightness (reflectance at 457 mμ) of an unbleached kraft pulp appears to be a direct function of the lignin content. The wood species from which the pulp was derived and the cooking conditions seem to affect the color only as they affect the amount of residual lignin. The greater brightness of kraft hardwood pulps, as compared with softwood pulps, appears to be a result of the greater extent of removal of lignin from the hardwoods, rather than of the presence of specific color-precursors in softwoods. The amount of hypochlorite bleach required to bring a series of slash pine kraft pulps to a brightness of 65 was found to be a linear function of the lignin content of the unbleached pulps. A similar relationship for kraft pulp from jack pine seems to exist. Pulping of spruce and aspen holocellulose by the kraft process gives a much lighter pulp than when wood chips are used and the color is very easily bleached. Addition of lignin to spruce holocellulose and to partially chlorited spruce chips before digestion produces a colored pulp which is more difficult to bleach than the same pulps produced without the addition of lignin. A light color is produced on cotton linters by the addition of lignin to the linters before digestion with kraft liquors. A composite cook of the various known components of sprucewood produced a pulp colored to about the same degree as when lignin alone was added to the linters. "Caramelization" of sugars and other carbohydrates appears to be of minor importance in the formation of the kraft color. Color bodies are formed under the alkaline conditions of the kraft process but they are much more easily bleached than the typical kraft color bodies. As evidence for this conclusion, it is shown that holocellulose (the carbohydrate fraction of wood) does not yield a dark colored pulp resistant to bleaching. Also, cotton linters, when treated with kraft liquors containing D-glucose in quantity as much as 50% of the weight of the linters, yield pulps which, although dark in color, are easily bleached. 16 references. E.S.

LIGNIN

ABRAHAMSON, BIRGITTA, LINDGREN, BENGT O., and HÄGGLUND, ERIK. The sulfonation of spruce lignin. Svensk Papperstidn. 51,

no. 20: 471-4 (Oct. 31, 1948). [In German; English and Swedish summaries]

Sprucewood was heated with a mixed sodium sulfite-sodium bisulfite solution of pH 5.25 over a period of 11 hours to 135° C. and kept at this temperature for another 11.5 hours, whereby about one third of the lignin was dissolved. The lignosulfonic acid in the spent liquor was purified by passing it through ion-exchangers; the resulting product was relatively low in molecular weight and had a methoxyl:sulfur ratio of 1.3-1.9:1, indicating that, at this pH, the sulfonation did not exceed a ratio of methoxyl:sulfur of 2:1. The residual wood, recovered in 83.4% yield, had 3.97% methoxyl and 1.51% sulfur or a methoxyl:sulfur ratio of 2.7:1 and was not further investigated. The lignosulfonic acid, which consisted chiefly of β-lignosulfonic acid, was further sulfonated by heating it for six hours with a cooking liquor containing 1% calcium oxide and 6.5% total sulfur dioxide; this gave a barium lignosulfonate with 8.49% sulfur and 18.84% barium and a methoxyl:sulfur ratio of 1:1, indicating that, in the acid medium, the sulfonation proceeded much farther. Whereas the first lignosulfonic acids contained considerable amounts of carbohydrates, the resulfonated acids were free of sugars. There was no change in the ultraviolet absorption spectra of the lignosulfonic acids after resulfonation, which shows that sulfonation did not cause any deep-seated change in the structure of the lignin. F.E.B.

BLAND, D. E., HANSON, E. A., STEWART, C. M., and WATSON, A. J. The extraction of lignin from *Eucalyptus regnans* F.v.M. by means of methanol. J. Council Sci. Ind. Research 20, no. 4: 553-63 (November, 1947).

A survey of possible methods of extracting native lignin from immature *Eucalyptus regnans* F.v.M. led to the conclusion that one of the most promising solvents was methanol. Treatment with this solvent for 24 hours at 150° C. removed a little more than one quarter of the lignin, estimated as Klason lignin, present in a specimen of *E. regnans* sapwood sawdust. Treatment for 148 hours, using fresh methanol every 16 hours, removed about 70% of the original lignin estimated as Klason lignin. Evidence was obtained to show that the methanol extraction of wood is essentially a mild acid hydrolysis accompanied by the solvent action of methanol. During the process some of the extracted lignin was degraded to materials soluble in water and ether. The remainder could be precipitated as a buff powder which gave the color reactions of native lignin and which was soluble in bisulfite solutions. 12 references. E.S.

BONDI, A., and MEYER, H. Lignins in young plants. Biochem. J. 43, no. 2: 248-56 (1948).

Lignins were prepared by extraction with dilute alkali from a number of annual forage plants and from feces collected from sheep fed exclusively with the same plants. The plants used were *Eragrostis tef, Pencillaria, Setaria italica, Hordeum murinum* (wild barley), *Trifolium alexandrinum bersem, T. alexandrinum fahli, Lathyrus ochrus,* and hay of *Arachis hypogea* (peanut). All lignins contained nitrogen whose presence is not caused by accidental contamination with proteins, but seems to be a characteristic component of the lignin molecule itself. The methoxyl content ranges from about 5% in *Leguminosae* lignins (I) to about 10% in *Gramineae* lignins (II). On methylation with diazomethane, the original methoxyl content of (I) is trebled, that of (II) doubled. Methylation with dimethyl sulfate

brings about a small increase in methoxyl uptake over that obtained with diazomethane. In fecal lignins no additional methylation with dimethyl sulfate could be obtained. Cryoscopic molecular weight determinations in β-naphthol showed values of about 600 both for plant and fecal lignins. Oxidation of the plant lignins with nitrobenzene in alkali yielded vanillin and *p*-hydroxybenzaldehyde. Fecal lignins do not yield any aldehydes. The ratio of vanillin to *p*-hydroxybenzaldehyde was always 2:1. On fusion with potassium hydroxide all lignins gave catechol and protocatechuic acid. On heating the lignins with ethanol containing 3% sulfuric acid to 170-180° under pressure, 1-(4′-hydroxy-3′-methoxyphenyl)propane-1,2-dione was obtained only from plant lignins; both plant and fecal lignins yielded phenol, guaiacol, and an acid fraction which, after further oxidation with potassium permanganate, yielded vanillic and *p*-hydroxybenzoic acids. The experimental results are discussed in relation to the structure of the lignins. 36 references. E.S.

BRAUNS, F. E. Lignin—a botanical raw material. Econ. Botany 2, no. 4: 419-35 (October-December, 1948).

Of the 188,500,000 tons of wood cut in the United States in 1944, 3,400,000 tons was lignin chiefly from sulfite pulp mills, which was drained into rivers as a total loss. Methods of isolating lignin by extraction as soluble or insoluble derivatives are considered and the products of each method discussed. Lignin is technically available in large amounts in solution as a by-product of the pulp industry and in a solid state from the wood saccharification process. A review is given of the advances made in the knowledge of the structure of lignin, structural formulas being included, and its physical properties are described. The disposal and utilization of sulfite waste liquor is discussed and some consideration is given to soda lignin and kraft or thiolignin. One of the most valuable present uses of lignin is in its conversion into vanillin. 15 references. R.R.

CLARK, IRA T., HICKS, J. R., and HARRIS, ELWIN E. Constituents of extractive from Douglas-fir lignin residue. J. Am. Chem. Soc. 70, no. 11: 3729-31 (November, 1948).

Solvent extraction has removed a wax extractive of high melting point from the lignin residue of the dilute acid hydrolysis of Douglas-fir wood waste, a cheap, abundant material. Analytical data obtained indicated the presence of eicosanoic, docosanoic, tetracosanoic, and oleic acids; 1-eicosanol, and 1-docosanol; docosane, tetracosane, and hexacosane. The appearance of these compounds in the products of chemical treatments of this lignin residue indicates their carry-over from the original wood rather than evidence that they are derived from the lignin molecule. Also appearing in the extractive were a heptane-insoluble acidic resin, residual sugars, and sulfuric acid. 10 footnotes. E.S.

MEREWETHER, J. W. T. Studies on the lignin of *Eucalyptus regnans*. II. The nature of the hydroxyl groups and the presence of the carbonyl group in thiolignin. Australian J. Sci. Research. 1A, no. 2: 241-8 (June, 1948); *cf.* B.I.P.C. 19: 90.

E. regnans thiolignin reacts with *p*-toluenesulfonyl chloride in pyridine to form a hexatosyl derivative; its trimethyl ether reacts likewise to form a tritosyl derivative. Both compounds still have a free hydroxyl group which can be acetylated. Similarly, they yield a hexabenzoate and a tribenzoate, respec-

tively, by the Schotten-Baumann reaction but, in pyridine, thiolignin reacts with benzoyl chloride to give a heptabenzoate and trimethylthiolignin a tetrabenzoate. No reaction takes place when trimethylthiolignin is treated with triphenylchloromethane in pyridine. The above data are interpreted as evidence that of the four alcoholic hydroxyl groups three are secondary and one tertiary. With phenylhydrazine, thiolignin yields a phenylosazone; with *p*-nitrophenylhydrazine it yields a *p*-nitrophenylhydrazone. On the other hand, trimethylthiolignin does not react with phenylhydrazine, indicating the absence of nonenolizable carbonyl groups. Thiolignin condenses with benzaldehydes, indicating the presence of an active methylene group. From this evidence, it is deduced that the grouping $-CH_2-CO-CHOH-$ is present. 20 references. E.S.

MACHINERY

WARRELL, W. C. From stuff tap to first press. Paper-Maker (London) 116, Annual no.: 6-10 (1948).

With reference to a paper given by Nuttall under a similar title in 1925 (*cf.* Proc. Tech. Sect. Paper Makers' Assoc. Gt. Brit. & Ireland 6: 113-22 [1925]), the author discusses certain developments evolved during the intervening period, which have increased efficiency and economy. He refers to the Toledo scale weighing machine and describes improvements on rifflers, screens, the headbox, slices, suction boxes, couch rolls, and the drive of the dandy roll. E.S.

MACHINERY—DRIVE, ELECTRIC

BAKER, R. R., and BAKER, V. B. Electric drives on high speed modern paper machines. Paper Mill News 71, no. 50: 45-6, 48, 89 (Dec. 11, 1948).

Special reference is made to the multiple generator type of sectional drive and the all-electronic section speed regulator; *cf.* abstract below. E.S.

BAKER, V. B., and KOVALSKY, J. F. The sectional paper machine drive and its electronic counterpart. Paper Trade J. 127, no. 26: 18-24 (Dec. 23, 1948).

The authors discuss the problems of regulation of sectional electric paper-machine drives, including single and multiple generator systems, and the use of electronics in high-accuracy speed regulation. All-electronic regulators have been applied to a number of machines producing widely different types of paper, including tissue, book, and kraft. The operating experience indicates that the over-all system design is sound. As with all precision equipment, a carefully planned maintenance program is essential to the continued high-level performance of these systems, including periodic testing of all high-vacuum tubes, testing of all tubes before installation, and keeping records of their performance and failures. 8 figures. E.S.

GENERAL ELECTRIC COMPANY. Electronic amplidyne speed regulator for sectional paper machine drives. Paper Mill News 71, no. 50: 70, 72-4, 76, 78, 80-1 (Dec. 11, 1948).

Performance measurements on the modern electronic amplidyne speed regulator for paper machine drives are described. These measurements show the high accuracy, stability, and fast response provided by this modern drive, under normal as well as severe conditions of load variation, power system frequency, and voltage variation. E.S.

THE RELIANCE ELECTRIC AND ENGINEERING COMPANY. Precision speed control key feature of new newsprint paper machine. Paper Mill News 71, no. 50: 54, 56 (Dec. 11, 1948).

The electric drive of the new Bagley and Sewall newsprint machine at Southland Paper Mills, Inc., of Lufkin, Texas, is described. Built by The Reliance Electric and Engineering Co. of Cleveland, it is designed to provide an operating speed range of from 600 to 1800 ft./min. and is regulated by the Reliance Section Interlock Regulator, a recent development in differential gear control. E.S.

MACHINERY—MECHANICAL SEALS

SCHMITZ, CARL E. The mechanical seal—its construction, application, and utility. Paper Trade J. 127, no. 25: 21-5 (Dec. 16, 1948).

The author outlines the important construction features of the mechanical seal and discusses speed, pressure, temperature, viscosity, application considerations, advantages, conditions under which special constructions are desirable, utility, and suggested services. The mechanical seal has demonstrated its utility in many industries and on a variety of equipment, such as compressors, pumps, speed reducers, agitators, vacuum processing equipment, etc. E.S.

MACHINERY—PAPER MACHINE—YANKEE TYPE

WALLIN, SAM. The development of the Yankee machine in Sweden. Cellulosa och Papper, SPCI 1908-1948: 445-56 (1948). [In Swedish; English summary]

Of the 233 paper, wadding, and board machines now operating in Sweden, 108 are Yankee machines. The earliest machines were imported from Germany and the first installation was made at Munksjö in 1862; later machines came from England. The first Swedish-built machine was installed in 1895. The gradual development and changes in the construction are discussed with the help of 14 diagrams. New construction details have recently been announced from the United States, but have not yet been incorporated in Swedish machinery. These trends may be expected to influence also the future developments in northern Europe. E.S.

MACHINERY—PRINTING MACHINE

THE PRECISE ENGINEERING COMPANY, *Chicago.* New coating and printing method. Fibre Containers 34, no. 11: 92, 94 (November, 1948); *cf.* B.I.P.C. 19: 250.

A new high-speed web-feed press has been designed, which will take mill rolls of the cheapest boxboard, paper, tissue, or foil and, in one pass, apply a thermoplastic coating and print in several colors on top of the coating. Any grade of board may be rotogravure color process printed and in the same operation have an over-all protective plastic film printed on top of the colors. The back of the board may also be coated with plastic to make it waterproof and heat sealable. White clays can be incorporated in the coating. The plastic surface will not curl or cause the printed sheet to curl, even though it is applied to one side only. Web speeds of 300-400 ft./min. may be maintained with perfect color registration and high quality printing. Stock for bakery packages, coffee bags, and labels is being made on the new press, which is available for printing widths from 26 to 42 inches in one to five colors, with unwind and rewind as standard equipment. R.R.

MACHINERY—REFINERS

SUTHERLAND, DOUGLAS G. Modernization of stock preparation. Paper Mill News 71, no. 46: 94, 117 (Nov. 13, 1948); Fibre Containers 33, no. 12: 110-11 (December, 1948).

The ideal modernization will increase tonnage, improve quality, and reduce cost per ton; to keep capital investment costs low, it is vitally important to utilize existing facilities (including available floor space and power) to the greatest possible extent. The author shows that the Sutherland continuous beater and refiner will fulfill all these requirements; it will produce pulp with a high drainage rate, thereby allowing the paper machines to operate at speeds much higher than those used with their original stock preparation equipment. A summary of a few recent Sutherland modernizations is given. E.S.

MACHINERY—SAVE-ALLS

HUTCHINSON, O. F. Actual and potential white water system with the Sveen Pedersen saveall. Paper Trade J. 127, no. 23: 44-9 (Dec. 2, 1948).

With particular reference to the recent water pollution act—Public Law 845—the most efficient use of each part of a white water system (Fourdrinier wire or cylinder mold, white water trays, wire pit, couch pit, shower water, tanks, pumps, clarifiers, etc.) under different conditions and with different hookups is discussed. Flow diagrams for Fourdrinier and cylinder machines are included, and the advantages of the Sveen Pedersen saveall as a clarifier are stressed. After developing a good white water system, it is essential that an individual be assigned the responsibility of keeping it operating efficiently at all times. E.S.

MACHINERY—SCREENS

FAHLGREN, SVEN. The Jonsson screen and its application to a variety of stock production problems. Paper Trade J. 127, no. 24: 17-19 (Dec. 9, 1948); Paper Ind. 30, no. 8: 1257, 1262 (November, 1948); Southern Pulp Paper Manuf. 11, no. 12: 46, 50-2 (December, 1948).

After briefly outlining its construction, the author discusses the possibilities of the Jonsson screen as a knotter for sulfite and sulfate stocks, groundwood, Asplund Defibrator and Masonite stocks, and for screening groundwood, board and filler stocks, straw stocks, waste paper, and deinked stocks. E.S.

MATERIALS HANDLING

ENGINEERING PRODUCTS COMPANY, *Chicago.* Turning the load. Fibre Containers 34, no. 11: 82 (November, 1948); Shears 66, no. 672: 41 (December, 1948).

Trackage conveyors and four- and three-way turntables greatly facilitate the handling of heavy merchandise and stock. The new angular fan-tail unit is stationary, the load being turned easily in any direction on ball bearings. These units require a maximum depth of four inches, the same as is necessary for the track and turntables. Illustrations are included. R.R.

MATERIALS OF CONSTRUCTION

KALLING, BO, and LILLJEKVIST, GUNNAR. The revolution caused

by the introduction of stainless steel. Cellulosa och Papper, SPCI 1908-1948: 190-219 (1948). [In Swedish; English summary]

The authors survey the most important inventions and experiences made with stainless steel since it was first introduced on the market. Structural and physical data for some commonly used types are given. Applications in the pulp and paper industry are described. E.S.

METALLIZING PROCESS

WAKEFIELD, JOHN E. Metallizing helps keep pulp and paper machinery in operation. Southern Pulp Paper Manuf. 11, no. 12: 58, 60, 62, 86 (December, 1948); *cf.* B.I.P.C. 19: 251-2.

This is a more extensive description of the possible applications of the metallizing process to the repair of pulp and paper machinery than the previous reference. E.S.

METERS AND RECORDERS

SHOLL, H. A. Continuous measurement of sheet moisture. Tech. Assoc. Papers 31: 375-8 (1948).

For the past ten years paper mill technicians and instrument engineers have been conducting exhaustive field tests on Moist-O-Graphs installed in mills making a variety of paper and board. These tests, carried out under actual production conditions, have firmly established the ability of this instrument to operate successfully in mills producing blueprint, bristol, board, chart, chip, coated, condenser tissue, container, currency, folding box, greaseproof, kraft, label, ledger, lithograph, manila, mill wrapper, mimeograph, offset, rayon pulp, roofing felt, test liner, and toilet paper. The instrument bases its operation on the relationship between the moisture content and the electrical conductivity of the paper sheet, a method proved stable and almost entirely unaffected by variations in machine speed, mechanical draw, machine ventilation, furnish, caliper, and sheet formation. E.S.

MICROBIOLOGICAL TESTING

SHEMA, B. F. A method for the determination of the resistance of paper and paperboard to penetration by fungi. Paper Trade J. 127, no. 26: 41-2 [T.S. 536-7] (Dec. 23, 1948); Tech. Assoc. Papers 31: 364-5 (1948); Paper Ind. 29, no. 12: 1831-2 (March, 1948).

In the packaging of food for the armed services, it became desirable to evaluate the resistance of the carton to the penetration of fungi. A method was developed whereby an inoculum of a fungus, *Chaetomium globosum*, is placed in a cut out from the center of a specimen board which is then sealed both sides with the sample board in a sandwich arrangement. The time and extent of penetration are noted during an incubation period. E.S.

MICROSCOPY

DE GRUY, INES V. Textiles through the microscope. Sci. Monthly 68, no. 1: 61-5 (January, 1949).

The author discusses, in a more or less popular manner, the role which microscopy plays in the improvement of commercial textiles, including the takeup of dyes and synthetic resins; the study of tire cord construction,

adhesion, and impregnation, as well as the structure of raw and treated cotton; fiber identification; etc. 11 photomicrographs and 11 references. E.S.

MICROSCOPY (ELECTRON)

PRESTON, R. D., NICOLAI, E., REED, R., and MILLARD, A. An electron microscope study of cellulose in the wall of *Valonia ventricosa*. Nature 162, no. 4121: 665-7 (Oct. 23, 1948).

In an attempt to secure evidence for or against the possible existence of supermolecular units of structure ranging from fibrils about 0.4 μ in diameter and of indefinite length to small spherical or ellipsoidal particles with a maximum diameter of 1.5 μ, the authors are using the electron microscope to study the cell wall of *Valonia ventricosa*. This alga is well adapted to such study because it has a cell wall of large area, which is strong enough to withstand handling and has a known structure so as to make interpretation of the electron micrographs possible. Preliminary studies have shown that the wall seems to consist of fibers of indefinite length and diameters varying between narrow limits around 300 A. Within any one lamella the fibers run closely parallel to each other, with the exception of stray fibers which were probably displaced during the preparation of the specimen. In an adjacent lamella seen through the interstices in the upper lamella, similar fibers are visible, lying at an angle to the first set, usually not quite a right angle but occasionally much less; sometimes a third orientation can be detected. The fibers might be regarded as crystallites of cellulose. Two photographs are given and a discussion is presented of information which may be gained through their study. 10 references. R.R.

NEWSPRINT

MCHALE, W. L. History and growth of newsprint industry in the South. Paper Trade J. 127, no. 27: 25-7 (Dec. 30, 1948); Southern Pulp Paper Manuf. 11, no. 12: 54, 56, 86 (December, 1948); Paper Ind. 30, no. 8: 1254-6 (November, 1948).

The author outlines the development of Southland Paper Mills, Inc., at Lufkin, Texas, the first mill to produce newsprint from southern pine. Although it began its corporate existence under charter in May, 1937, it was not until January, 1940, that the first commercial run was made. A second newsprint machine was brought into production on March 29, 1948. The two machines now produce 120,000 tons annually. Further growth of the newsprint industry in the South is being undertaken at Childersburg, Ala., where a two-machine mill is now under construction by the Coosa River Paper Co. E.S.

PAPER—COATED

CASEY, JAMES P., and LIBBY, C. E. A study of penetration of starch adhesive in a coating mixture into base paper. Paper Trade J. 127, no. 25: 83-90 [T.S. 522-9]; no. 26: 35-41 [T.S. 530-6] (Dec. 16, 23, 1948); Tech. Assoc. Papers 31: 172-85 (1948).

Two subjects are discussed—first, the factors which affect the penetration of the adhesive in a coating mixture into base paper and, second, the relationship between the depth of penetration of the adhesive into base paper and the properties of the final coated sheet. The results indicate that the depth of penetration of the starch adhesive into the base paper is decreased by increased sheet density, increased sizing, decreased sheet moisture con-

tent, and, to a lesser extent, by the presence of alumina in the sheet. There appears to be a straight line relationship between the depth of penetration of the adhesive in microns and the ink receptivity of the coating. However, there is no definite relationship between the depth of penetration and the wax number of the coating since this property seems to be more affected by the strength of the base paper than by the depth of penetration of the adhesive. Increasing the depth of penetration of the adhesive tends to decrease the smoothness of the uncalendered coating. In general, the wax number of the coating tends to increase with increased density of the base paper and to decrease if either rosin or clay are added to the base paper. The ink receptivity of the coating decreases with increased density when the base paper is unsized, but is not appreciably affected when the base paper is sized. The ink receptivity decreases as the amount of size in the sheet is increased. The smoothness of uncalendered coatings is increased by increased beating of the stock used in making the base paper up to a certain point, after which it decreases. The smoothness is also increased by increased sizing. 13 references. E.S.

PAPER—FILLERS

GOLDSMID, P. The effect of loading on the properties of paper. Paper Making and Paper Selling 67, no. 3: 45, 58 (Autumn, 1948).

The loading of paper lessens its substance, which is the ratio between the thickness of paper and its weight/sq. m., increases the porosity to air, imparts a greater resistance to liquids, and increases the absorbency and degree of satining. The whiteness of paper generally increases in proportion to the whiteness of the loading used. Because loading loosens the fibrous tissue and multiplies the number of surfaces, it increases the opacity of paper. Usually, the drier the paper, the more loading it contains. The nature of the loading has practically no effect on the hygroscopic properties of paper, although the use of a large amount of calcium sulfate will result in a paper which retains its moisture longer. A loading content of over 5% causes a drop in mechanical resistance, especially in folding and tear. Flexibility and therefore softness is increased with loading. R.R.

PAPER—SHEET FORMATION

BARRY, T. M. The relationship of stock preparation to the formation of sulphite papers. Paper Trade J. 127, no. 24: 59-60 [T.S. 514-15] (Dec. 9, 1948); Tech. Assoc. Papers 31: 216-17 (1948).

A practical approach to the subject is presented. Stock may be partially prepared in the digester and during the bleaching process as well as by mechanical means. Reference is made to the relationship of the various types of treatment to paper formation, and methods of control are indicated. E.S.

PAPER AND PULP INDUSTRY

FAHLSTRÖM, JAN MAGNUS. The economic development of the Swedish pulp and paper industry during the 20th century. Cellulosa och Papper, SPCI 1908-1948: 69-80 (1948). [In Swedish; English summary]

The author describes the development of the Swedish pulp and paper industry, particularly the chemical pulp industry, and the important part it has played in the economy of the country. About 1940, the industry had to realize that it had reached the limits of its annual timber cut and that

further expansion was not possible without serious forest depletion. The scarcity of pulpwood necessitates an intensified forest cultivation, higher efficiency in the mills, and development of more refined products, such as rayon pulp. The effect of the second world war and the postwar period on the industry are discussed. 20 references. E.S.

HALL, GÖSTA. Technical service. Cellulosa och Papper, SPCI 1904-1948: 220-31 (1948). [In Swedish; English summary]

The popularity enjoyed by Swedish industrial products in the world market is primarily based on a high quality standard. An extensive technical service established by leading enterprises has contributed in no small measure to this success. Examples of "technical service to the customer" in the United States are given and reference is made to the "Emballageinstitut" financed by the Scandinavian kraft industry in Paris for stimulating the consumption of kraft paper and board in Europe. In conclusion, the necessary qualifications of technical service men are discussed, including a thorough technical and economic background and a knowledge of the languages (including technical vocabulary) of the countries concerned. In times of pulp scarcity, the services of such men may not seem to be important; however, as soon as competition returns, the industry should be prepared for the emergency by now training suitable young men to become technical service experts in the field of the Swedish forest products. E.S.

HASSØ, ARTHUR G. The manufacture of paper in Denmark. Cellulosa och Papper, SPCI 1908-1948: 81-7 (1948). [In Swedish; English summary]

A historical account of the development of the paper industry in Denmark is given. E.S.

OJALA, ONNI O. The paper and pulp industry in Finland during the six last decades. Cellulosa och Papper, SPCI 1908-1948: 88-117 (1948). [In Swedish; English summary]

The author discusses the forestry situation and power development in Finland and, after a few historical remarks, the growth of the pulp, paper, and wallboard industry of the country. Statistical data and graphs are included. Special reference is made to the establishment of central organizations, sales organizations in particular, and technical developments. The activities during and after the war, by-products of the industry, the recent rapid increase in the manufacture of wallboard, and social welfare work within the industry are also reviewed. E.S.

STEENBERG, BÖRJE. Trends in paper quality. Cellulosa och Papper, SPCI 1908-1948: 429-44 (1948). [In Swedish; English summary]

The author reviews the trends in paper quality from the angle of available raw materials and the adaptability of existing paper-mill machinery. With regard to raw materials, reference is made to bleached groundwood, bleached sulfate, semichemical pulps, hardwood pulps, straw, waste paper, and improved fiber recovery. With regard to new machinery, its nonavailability in the old world will certainly not be inducive to new developments; on the other hand, it will prevent rapid developments with their resulting repercussions. Paper as a competitor of textiles, glass, and metal is discussed, and new applications of wet-strength paper as packaging material in the frozen-food field are mentioned. Finally, the trends in printing paper, news-

print, magazine paper, greaseproof and glassine paper, condenser and electrical insulating paper, and wrapping paper are outlined. E.S.

SUNDBLAD, GUNNAR. Aspects of the technical development of the pulping industry in Sweden. Cellulosa och Papper, SPCI 1908-1948: 11-18 (1948). [In Swedish; English summary]

A broad outline of the history of the industry from its earliest beginnings is given. E.S.

WALLER, A. Quality first; the quality development in the Swedish pulp industry during the recent decades. Cellulosa och Papper, SPCI 1908-1948: 136-47 (1948). [In Swedish; English summary]

Reference is made to the gradual increase in the percentage of bleached grades, especially dissolving pulps, as well as to the general improvement of the various grades of pulp. At present, 40% of the Swedish sulfite production is bleached—60% of this amount consisting of dissolving pulps—and 20% of the output of sulfate pulp is bleached kraft. One mill also produces a certain amount of sulfate dissolving pulp. The part played by scientific and technical research is emphasized, particularly the beneficial influence of improved bleaching procedures. A comparison between the strength and whiteness of bleached pulps manufactured in 1930 and 1938 is made and typical analyses of various grades of present-day Swedish viscose and high-alpha pulps are given. The development of suitable standard testing methods, the study of fundamental reactions during cooking and bleaching, and improved and extended research facilities have greatly contributed to these advances. The Swedish pulp industry is well prepared to keep its prominent position with regard to quality, which is considered a fundamental factor for the future of this industry. E.S.

PAPER AND PULP INDUSTRY—EDUCATION

MCGARVEY, GEORGE A. Training in the vocational schools. Tech. Assoc. Papers 31: 373-5 (1948); Paper Ind. 30, no. 4: 623-5 (July, 1948).

The schools and courses of high school grade and terminal in nature which are devoted to vocational education are discussed. The National Vocational Education Act which was passed in 1917 was the first grant of aid for vocational education and, whereas it was initially devoted to training workers during World War I, it was not until 1919 and 1920 that all the states were organized. Under the program there has been a steady growth in the preparation and upgrading of workers under public supervision and control during the intervening years. Foreman training conferences have been conducted at several paper mills and of special interest to the paper industry was the publication of the U. S. Office of Education, "Vocational training in the pulp and paper industry." The author suggests that more attention should be given to the extension of a training program on the basic processes of the industry in the public schools as well as to operating groups. E.S.

PAPER AND PULP INDUSTRY—TRANSPORTATION

HASTINGS, EDWIN CHESTER. Safe shipping and delivery of newsprint paper. Paper Trade J. 127, no. 24: 12-13 (Dec. 9, 1948).

The author discusses the problems involved in the safe railroad transportation of newsprint rolls and points out bad practices in handling them.

Two possible ideas are advocated by paper converters to reduce damages: a standard heavy paper case or jacket made from the same material as used in paper pallets to protect the roll in transit, and metal cores (aluminum) of sufficient length, which the converter would return to the mill for full credit. The advantages and drawbacks of these suggestions are reviewed. E.S.

PAPER AND PULP MILLS

ANON. A great specialty mill expansion at Camas. Pulp & Paper 22, no. 13: 62-4, 67-8, 70, 72, 74 (December, 1948).

The multimillion dollar expansion of the Crown Zellerbach mill at Camas, Wash., which is now completed except for the new wood preparation plant, is one of the most highly diversified operations to be found in one place. The expansion program has included a new kraft pulp mill, recovery and power plant, screen room, bleach plant, paper machines, and finishing and converting equipment plants. An illustrated description of the new equipment is given. R.R.

PULP & PAPER. Across Canada and Newfoundland, machines and mills. Pulp & Paper 22, no. 13: 37-40 (December, 1948).

About 20 Canadian and Newfoundland pulp and paper mills were visited to secure material for this survey of new important developments in the industry there. Among the mills and companies considered are Bowater's Newfoundland Pulp & Paper Mills, the Powell River Co., Great Lakes Paper Co., Canadian International Paper Co., Bloedel, Stewart & Welch, Puget Sound Pulp & Timber Co., LongLac Pulp & Paper Co., Fraser Companies, and Maritime Pulp & Paper Mills. One of the most interesting changes in the industry is the development of by-products such as ethyl alcohol, vanillin, a new lignin-melamine plastic product called Arborite, and Tomlinite lignin powder, with plans for the production of turpentine and tall oil. R.R.

YOUNG, R. H. R. Specialty papers manufactured by Pacific Mills Limited at Ocean Falls and Vancouver, B. C. Pulp Paper Mag. Can. 49, no. 12: 86-8 (November, 1948); Paper Trade J. 127, no. 25: 31-4 (Dec. 16, 1948).

The author describes first the equipment of the pulp and paper mill at Ocean Falls, comprising a sawmill, sulfate mill, groundwood mill, two-stage sulfite bleach plant, and paper mill housing six machines. Two of these produce newsprint, three specialties (all grades of wrappings, toilets, tissues, butcher grades, bread wrappers, kraft bags, printing paper, envelope paper, etc.), and the sixth machine is a combination pulp drier and coarse-grade machine, making mill wrap and core paper and chipboard. The paper is shipped in barges to Vancouver, where the converting operations are carried out in two locations, one plant dealing with paper products and the other with corrugated and solid board and boxes. The equipment and products of each plant are summarized. E.S.

PAPER AS A TEXTILE MATERIAL

BRECHT, W. The influence of the moisture and water content upon the strength properties of a spinning paper. Melliand Textilber. 28, no. 11: 367-71 (November, 1947). [In German]

The author studied the variations in the individual strength properties which a sulfite spinning paper underwent in the machine and cross-machine

directions in the complete range from almost ovendry through airdry to the water-saturated condition. The mechanism of moisture and water absorption by paper is outlined briefly. Viewed as a whole, the strength properties of a paper depend to a much larger extent on its moisture and water content than is generally assumed. The differences in all the strength properties in the two main directions are essentially a function of the moisture content, although the changes caused by different moisture contents vary for the individual strength properties. No maximum values are obtained in the ovendry condition; with the exception of tensile strength and burst—which correspond almost to the values obtained in airdry condition—all strength properties are weak and the differences between machine and cross-machine direction are almost negligible. The maximum for the breaking load was reached at 5%, for burst at 8%, for folding endurance at 16%, for initial tear at 18%, for tear-through at 22%, and for elongation at 24% moisture content. The difference between the two directions was always the greatest at the water content corresponding to the maximum strength value. Although all strength properties decreased after passing through their maximum values, burst and folding endurance had completely disappeared at 50% moisture, whereas elongation and tear-through in the machine direction and initial tear in both directions were not much lower than the corresponding values obtained for the ovendry papers. The results for the complete range are also illustrated in four diagrams. E.S.

BRECHT, W. Reporting the water content and the water absorption of papers. Melliand Textilber. 29, no. 1: 1-3 (January, 1948). [In German]

It is customary in the textile industry to report the moisture content of raw materials and manufactured products by reference to the weight of the absolutely dry substance, whereas the papermaker refers to the moist weight. This difference of expressing the moisture factor by papermaker and spinner can readily lead to misunderstandings, particularly in the case of spinning papers which must possess a typically high moisture content. The increase is brought about by a special moistening process, which both papermaker and spinner call moisture absorption (degree of moistening). With the aid of formulas, tabulated data, and graphs covering both moisture content and absorption, the author shows how one form of expression can be converted into the other. E.S.

RUDOLPH, HANS. Problems of impregnation of paper yarns and paper fabrics. I. The influence of the impregnation upon the spinning properties of papers. II. The influence of the impregnation upon the strength properties of the yarns. Monatschr. Textil-Ind. 55: 305-9 (1940); C.A. 35, no. 14: 4957 (July 20, 1941). [In German; abstract in English]

Experiments carried out with 12 impregnating agents yielded an increase of spinning powers only with six products. The dry strength of paper yarns can be increased 20% with spinning softeners and 30-50% with commercial impregnating agents. The wet strength of the paper yarns is 40-50% of the dry strength. It is not possible to draw conclusions from the water absorption of yarns about the strength in the dry state. E.S.

RUDOLPH, HANS. Problems of impregnation of paper yarns and paper fabrics. III. Strength properties of paper fabrics. Monatschr. Textil-Ind. 56: 19-23 (1941); C.A. 42, no. 10: 3569 (May 20, 1948). [In German; abstract in English]

Paper fabrics made from yarns of spinning paper were impregnated with oil and with two compounds (L and C, no other identification given). The impregnation was carried out in a bath, by means of brushing, and with a jet spray. The tensile strength and degree of stretch of the dry impregnated and unimpregnated fabrics were determined. The fabrics were then wetted and redried and the strength values again determined at each step. Impregnation increased the tensile strength of the dry fabric by about 15%. The wet strength was 30 to 45% of the dry strength and was apparently unaffected by impregnation. The strength of the wetted and redried fabric was about 75-80% of that of the original dry tensile strength. E.S.

RUDOLPH, HANS. Problems of impregnation of paper yarns and paper fabrics. IV. Effect of impregnation on the moisture absorption of paper yarns and fabrics. Monatschr. Textil-Ind. 56: 43-5 (1941); C.A. 42, no. 10: 3569 (May 20, 1948). [In German; abstract in English. Abstract only available]

Paper yarns and fabrics impregnated with 11 different compounds (designated by letter, composition not given) were soaked or sprayed with water for varying lengths of time. The unimpregnated paper fabric absorbed about the same amount of water as jute fabric. Impregnation reduced the amount of water absorbed. Calendering the impregnated paper reduced the degree of absorption still further. In general, the improvement in tensile strength of the fabric produced by impregnation is of greater importance than increased resistance to water absorption. E.S.

PAPER MANUFACTURE

PAPER SALES. Paper making: Part IV—Refining the pulp. Paper Sales 8, no. 12: 17-19 (December, 1948); *cf.* B.I.P.C. 19: 179.

The first steps in the manufacture of paper from pulp, beating and jordaning, are described and illustrations of the equipment used are given. R.R.

PAPER SPECIALTIES

ANON. Diamond paper: how the precious stones industry requires specialized paper wrappers. Paper & Twine J. 22, no. 9: 8 (November, 1948).

The best grade of rag tissue with two linings of fine parchment is often used for wrapping diamonds, which may adhere to ordinary tissue in humid weather and cut through common paper. About six tints are used to show the stones to their best advantage, and several color combinations are used in the inner and outer wraps. White or blue wraps are generally used for diamonds, brown for the outside wrapper for sapphires, emeralds, and rubies, and white or cream and blue for pearls. R.R.

ANON. Display paper sales should not end with the holiday season. Paper Sales 8, no. 12: 12-13, 40 (December, 1948).

Advances in paper production and conversion resulting in special display papers which can replace more expensive materials formerly used, and the great flexibility of paper have resulted in the greatly increasing use of display papers in the past seven years. Sales of such paper should not be limited to the Christmas season but should continue throughout the year. Most manufacturers provide seasonal lines in addition to regular stock.

The salesman must be able to supply information regarding sizes, colors, patterns, etc., to display artists, and also to act as a consulting artist to small retailers who do their own decorating. Such information is available from manufacturers' promotional and display pamphlets. Display papers can also be used as a wedge to interest some accounts in other items. Suggestions for display paper outlets include stores, manufacturers and wholesalers with show and sample rooms, and the home market for parties, bazaars, and group meetings. R.R.

ANON. What is filter paper? Paper & Twine J. 22, no. 9: 15-16 (November, 1948).

The author briefly discusses the manufacture and stock of quantitative filter paper, which is used for very precise analyses and must be entirely free from alkalies, acids, and minerals; qualitative filter paper, which, like the quantitative paper, is 100% cotton fiber, and which is made as neutral as possible with ordinary precautions; and industrial filter papers, made from cotton and wood pulp fibers. The first two grades are imported chiefly from England and, to a lesser extent, from Germany and France; the industrial papers are made in the United States. One of the most important essentials in making filter papers is pure water, which must be distilled for quantitative papers. Each grade is made in varying weights, thicknesses, and textures to comply with rigid specifications for pressure, durability, temperature, etc.; the textures range from close to open and the surface may be smooth, creped, or embossed. R.R.

KULLGREN, CARL. Investigations concerning filter paper. Svensk Papperstidn. 51, no. 20: 475-80 (Oct. 31, 1948). [In German; Swedish and English summaries]

Filter paper possesses the capacity for cation exchange (I), the corresponding acid being fairly weak. The author determined (I) for different kinds of filter paper, one German Schleicher and Schüll and three Swedish filter papers of Munktell, which gave the following values: 1.03, 0.74, 0.72, and 1.00 cc. 0.01 *N*/gram of paper. When filtering very dilute acids or ammonia solutions, the results can be considerably affected by (I) of the filter paper. Washing with distilled water also affects the amount of cations present in the paper or of other substances in contact with it, provided they exhibit (I). The dissociation of the weak acid in filter paper was determined and examples of the calculations are given. In the case of the cation consisting of 25% sodium ion, the degree of dissociation for the German filter paper was found to be 11%, and for one Swedish paper, 13%. On the wrappers of the better grades of filter paper for quantitative analysis, the ash content is frequently indicated. The author shows that this ash consists almost exclusively of the ash of the cations. Since the cations vary according to the solutions which pass through the filters, it is not the ash content which should be indicated on the outside of the packages but (I). Examples and tabulated data are given. E.S.

MODERN PACKAGING ENCYCLOPEDIA. New developments in decorative packaging. Modern Packaging Encyclopedia, 1949: 587-90, 595, 597 [New York, Packaging Catalog Corp., c1948]

A discussion is given, with illustrations, of recent developments in paper and box-cover designs, lithographed box coverings, transparent packaging, chain store promotion, films and foils, plastic jewelry boxes, metal boxes, color on glass, pottery, decorative corrugated, ribbons, ties, and tapes. R.R.

PAPER SALES. Which cup or container is right for the job? Paper Sales 8, no. 12: 20-2 (December, 1948).

Information is given on the correct size and type of paper container to use with various foods and beverages. The material is alphabetically arranged by the item to be served, making the information quickly available to the paper salesman. This is the first of a series of "Pages for a paper salesman's sales book." R.R.

SHERMAN PAPER PRODUCTS CORPORATION, *Newton Upper Falls, Mass.* New accordion-pleated paper bag. Packaging Parade 16, no. 191: 75 (December, 1948).

An improved accordion-pleated machine-made paper bag, now available, can be stored compactly when folded, opened easily, and used for a variety of products, such as furniture and major appliances. An air vent in each corner of the bag permits pocketed air to escape without affecting its dustproof qualities. The bag is made of various kraft papers, including creped, waterproofed, and jute-reinforced. R.R.

THORSTENSEN, SV. An investigation of Swedish, Danish, and Norwegian paper used for the printing of maps. Norsk Skogind. 2, no. 10: 270-7 (October, 1948). [In Norwegian; English summary]

The author studied the use requirements of map paper employed in the Scandinavian countries, particularly their strength and durability. Tabulated data of the results are given, which indicate a great difference in strength between the various papers used for this purpose; some are definitely below the required standard. Reference is made to one satisfactory Norwegian paper (Pergaloid); this, however, is too expensive for general map printing. The author then analyzed samples of so-called wet-strength paper (melamine) developed during the war. A comparison of the data obtained with Norwegian map paper showed that the folding endurance of the former is 110 times better in dry condition; when wet, the folding resistance of the Norwegian paper decreased to zero, whereas the wet-strength paper changed into a parchment-like quality with a folding endurance of 7419. The importance of wet-strength papers for maps to be used under adverse climatic conditions is emphasized. With regard to the economic angle it is pointed out that the price of wet-strength paper (based on 1946 data) is not considerably higher than that of the untreated paper; since synthetic resins have lately shown a definite downward price trend, it may be expected that the difference will be completely removed in the future. E.S.

PATENTS

FELLNER, I. J. Discovery of patent infringement. Chem. Eng. News 26, no. 50: 3686-8 (Dec. 13, 1948).

Infringement of patent rights (a 17-year privilege to exclude others from making, using, and selling the patented invention) must be proved by the person who sues, an action usually instituted by the patentee or his assignee. Before starting such a suit, the patentee should determine: (1) that his patent claims can hold up under a challenge with respect to scope and validity; (2) the actual actions of the defendant in trespassing the patentee's rights; and (3) whether the actions of the alleged infringer exactly follow the patented invention as defined by the claims. Where no direct proof of

infringement is obtainable, the patent owner may call upon the alleged infringer for discovery and inspection, proceedings now governed by the "Federal rules of civil procedure." The plaintiff may file interrogatories addressed to the contesting party to the effect of soliciting data, facts, and admissions. Should the interrogatories be rejected by the court after close scrutiny or be unsatisfactorily answered, the patentee may resort to subpoena depositions by witnesses or to inspection of documents and other information. Cases and the decisions given are cited to show the principal criteria controlling the preliminary fact-finding procedure. The new rules regarding this are intended to facilitate the speedy and economical settlement of patent disputes, with the result that requests for discovery are now being viewed more liberally and favorably than previously. The material or statement requested must have a direct and immediate bearing on the controversial subject. R.R.

PHOTOCHEMISTRY

EGERTON, G. S. The action of light on cellulose acetate rayon and nylon dyed with Duranol, Dispersol, S.R.A., and Solacet dyes. J. Soc. Dyers Colourists 64, no. 10: 336-41 (October, 1948).

A study has been made of the photochemical degradation of cellulose acetate rayon and nylon yarns dyed with dispersed and soluble acetate dyes. Measurements were made of the losses in tensile strength of the yarns after exposure to sunlight in atmospheres of dry and moisture-saturated air. Many of the acetate dyes increase the degradation of nylon to a considerable extent, but have a very much smaller effect on the degradation of cellulose acetate rayon. In several cases the loss in strength of the dyed cellulose acetate is less than that of the undyed yarn exposed under identical conditions. The photochemical degradation of both textile materials, whether dyed or undyed, is caused by oxidation processes. The acetate dyes that are particularly effective in increasing the degradation of nylon are capable of increasing the degradation of undyed cotton that is simultaneously irradiated in their vicinity. In these cases the dye may be present on nylon, on cellulose acetate rayon, or as a dye film on glass. A much smaller effect is observed when undyed cellulose acetate or nylon is irradiated in proximity to these acetate dyes. Cellulose acetate rayon delustered with titanium dioxide also increases the degradation of undyed cotton irradiated in its vicinity. The small influence of acetate dyes on the photochemical degradation of cellulose acetate rayon and their larger effect on that of nylon are interpreted in terms of a theory involving oxidation of the textile material by activated oxygen and hydrogen peroxide. The relation between the fading of the dyed yarns and the degradation of the textile substrate is discussed, and it is pointed out that many of the dyes that increase the photochemical degradation of nylon are least fast to light on this fiber. 12 references. E.S.

EGERTON, G. S. The action of light on viscose rayon, silk and nylon, undyed and dyed with some vat dyes. J. Textile Inst. 39, no. 9: T293-304 (September, 1948).

A comparative study has been made of the rates of photochemical degradation of viscose rayon, silk, and nylon and cotton yarns undyed and dyed with different vat dyes. The yarns were exposed to sunlight in atmospheres of different compositions and relative humidities, and the consequent losses in tensile strength were used as a measure of the extent of photochemical degradation. The rate of degradation is very dependent upon the presence of oxygen in the surrounding atmosphere and, for all the textile materials

examined, the degradation is chiefly caused by oxidation processes. For exposure in air, the effect of humidity on the rate of degradation differs widely with the different textiles. The rate is greater in humid air than in dry air with both silk and cotton, the difference being particularly large when these textiles are dyed with sensitizing vat dyes of high activity. The effect of humidity is considerably smaller, though in the same direction, with viscose rayon dyed with active vat dyes. The rate of degradation of nylon yarns dyed or undyed is, however, but little affected when the relative humidity is changed from 0% to 100%. The vat dyes that are most active in sensitizing the photochemical degradation of the two cellulose textiles are the yellow and orange anthraquinonoid dyes, though some yellow and orange indigoid dyes are also active. The degradation of silk is sensitized as strongly by some indigoid dyes as by the most active anthraquinonoid dyes, and the action is not confined to the yellow and orange representatives. The degradation of nylon is also strongly sensitized both by some anthraquinonoid and by some indigoid vat dyes, not all in the yellow and orange shade range. Those dyes that are active on the cellulose fibers are all active on nylon, and, in addition, some that are not very active on the cellulose fibers activate the degradation of nylon. All those dyes that are active on nylon, as well as some that are not, are active on silk. The relative activity of the same vat dye on the different textiles depends upon the humidity of the air. In moisture-saturated air the effect of active vat dyes is generally greatest on silk, followed in order by nylon, cotton, and viscose rayon. In dry air the greatest effect is shown by the vat dyes on nylon. Observations are recorded on the rate of photochemical degradation of undyed viscose rayon delustered with titanium dioxide, and of dyed and undyed nylon similarly delustered. E.S.

EGERTON, G. S. The role of hydrogen peroxide in the photochemical degradation of cotton sensitized by vat dyes and some metallic oxides. J. Textile Inst. 39, no. 9: T305-18 (September, 1948).

It is known that the photochemical oxidation of cotton by air or gaseous oxygen is accelerated by the presence of certain yellow and orange vat dyes applied to the cotton by a dyeing or pigmenting process. It has now been shown that the photochemical oxidation of cotton may be accelerated by the presence of the sensitizing dye in the irradiated system when there is no contact between the dye and the cotton. In the experiments described the vat dye, exposed to light in the vicinity of undyed cotton, is supported either on an inert base such as glass or asbestos or on cotton to which it is applied by dyeing or pigmenting. In the latter case the experiments take the form of irradiating a sheet of yarn composed of alternate threads of dyed and undyed cotton not in contact with one another. In moist air or oxygen the undyed cotton is then found to be photochemically oxidized at a greater rate than the same cotton irradiated by itself, though not so rapidly as the cotton actually supporting the vat dye. In dry air or oxygen no such effect is observed even though the oxidation of the cotton in contact with the dye may be greatly accelerated. The action of the dyed thread on the adjacent undyed thread is almost independent of the distance between them over the range examined (0.3 to 8 mm.), but when several undyed threads are interposed between successive dyed threads the effect is almost entirely confined to the one or two undyed threads nearest to the dye. The well-known action of an active yellow or orange vat dye in accelerating the fading in light of other colors, such as blue direct or vat dyes, is also observed in a moist atmosphere when the sensitizing dye is in the vicinity of,

but not in contact with, the second dye. This "action at a distance," which must be caused by the formation of a volatile oxidizing agent, is ascribed to hydrogen peroxide. It is shown that when cotton dyed with an active vat dye is irradiated while suspended in dilute alkali a close correlation exists between the extent of photochemical oxidation of the cotton and the amount of peroxide formed. "Action at a distance" similar to that described above is also observed when cotton pigmented with zinc oxide or titanium dioxide is irradiated in a moist atmosphere in the neighborhood of cotton free from dye and pigment. The mechanism of the photosensitized oxidation of cotton is discussed in the light of these results. 16 references. E.S.

EGERTON, G. S. Some aspects of the photochemical degradation of nylon, silk, and viscose rayon. Textile Research J. 18, no. 11: 659-69 (November, 1948).

This is essentially the same information as that given in the preceding articles. E.S.

LANIGAN, H. The photo-chemical degradation of undyed and dyed cellulose irradiated by the mercury spectrum. J. Textile Inst. 39, no. 9: T285-92 (September, 1948).

Cotton cloth and viscose sheet impregnated with solutions of hypochlorite or of hydrogen peroxide, or merely exposed to moist air, were irradiated with the full mercury spectrum in the focal plane of a spectrograph, and the irradiated samples were "developed" in a hot, alkaline, complex silver solution. The reducing nature of oxidized cellulose resulted in the deposition of metallic silver on the samples in location and amount determined by the distribution and extent of the photochemical oxidation of the cellulose. "Degradation spectrograms" were thus obtained on the cellulose material reproducing some of the lines in the impinging line spectrum. When the cellulose was undyed, only the lines in the ultraviolet region of the mercury spectrum were developed but, when the cellulose was dyed with yellow or orange anthraquinonoid vat dyes, the "degradation spectrogram" showed, in addition to these, the lines in the visible region of the spectrum. This was true for the photochemical oxidation of cellulose by hypochlorite, hydrogen peroxide, and moist air. It can thus be demonstrated in a graphic way that the well-known acceleration in the photochemical degradation of cellulose produced by the presence of yellow and orange vat dyes is a result of the sensitization of the oxidation reaction to radiation of relatively long wavelength absorbed by the dye but not by the oxidation system proper. E.S.

PHYSICAL TESTING—INK

SCHLEICHER, F. GRANT. A survey of laboratory instruments for the printing ink industry. Am. Ink Maker 26, no. 12: 27-31 (December, 1948).

A report is given of a survey made by the New York Printing Ink Production Club of laboratory instruments available to the ink chemist and of direct value in solving daily problems. Consideration is given to mullers, a laboratory three-roller mill, sieves, fineness of grind gages, microscopes, extractors, viscosity and flow instruments, specific gravity instruments, vapor pressure measurement, flash point measurement, colorimeters, spectrophotometers, the inkometer, the Fade-Ometer, drying time recorders, balances, the tensiometer, refractometer, pH meter, photovoltmeter, and proof presses. R.R.

PHYSICAL TESTING—PAPER—GLOSS

SMITH, DANIEL, and MAHONEY, MARIE M. Reproducible gloss standards. Tech. Assoc. Papers 31: 427-9 (1948); Paper Trade J. 128, no. 2: 29-30 (Jan. 13, 1949).

A method is outlined for the preparation of reproducible replica gloss standards which can be made at almost any gloss level. E.S.

PHYSICAL TESTING—PAPER—OIL PENETRATION

BUBLITZ, WALTER J., DAPPEN, J. WAYNE, and VAN DEN AKKER, J. A. An investigation of the relationship between the permeabilities of paper to oil and air. Tech. Assoc. Papers 31: 305-15 (1948); *cf.* B.I.P.C. 13: 480.

The present work extends the investigation of Lane, with particular reference to Lane's findings on two phenomena: (1) The permeability of paper to purified oil decreased with total volume of flow of oil through the paper, with no indication of approach of the permeability to a constant value; when the paper was inverted to reverse the direction of flow, the oil permeability returned almost to its initial value. (2) The ratio of the air permeability to initial oil permeability was not unity but was observed to lie in the approximate range, 1.4 to 1.7. In the present work it was found that the rate of decline of permeability of paper to oil which had been treated with anhydrous copper sulfate was greatly reduced, whereas vacuum drying at elevated temperature had little effect. This finding, with observations with oil to which water had been added and which had subsequently been supercentrifuged, and with oil which had been filtered by passage through paper, and observations with the ultramicroscope of the number of light-scattering particles per unit volume of the oil subjected to various treatments lead to the hypothesis that the decline of the oil permeability is attributable to the presence in the oil of minute water droplets. The ineffectiveness of vacuum heating and the apparently low moisture content of oil as determined by long exposure in a vacuum oven are attributable to the high pressure which may be sustained in a small droplet by interfacial tension. In the further investigation of the inequality of the air and oil permeabilities, apparatus was developed for the determination of air permeability at high pressures, in order that the mean free path of the gas molecules could be varied over a large range and thereby permit an investigation of the possibility that the inequality of the air and oil permeabilities may be the result of "slip" (of the kind embraced by the kinetic theory of gases). In this phase of the work, oil permeability was also determined. It is shown that, although the equations for flow involving the slip term are not adequate, the ratio of air permeability to initial oil permeability is largely, if not completely, attributable to slip. The inadequacy of the flow equations is attributed to the large range covered by the dimensions of the pores of paper. E.S.

PHYSICAL TESTING—PAPER—POROSITY

DRAPER, A. J. M. An apparatus for measurement of air permeability of paper. Paper-Maker (London) 116, no. 5: TS 45-6 (November, 1948).

A modification of the apparatus designed by Potts (*cf.* B.I.P.C. 1, no. 10:17-18 [June, 1931]) is described, which is suitable for rapid routine testing. It differs from the Potts apparatus in the means of measuring the air flow and applying the pressure difference, no aspirator being used. How-

ever, for materials of extreme ranges it can be connected to an aspirator, thus merely becoming the Potts apparatus. The instrument, its application, the calibration of the flowmeter, and the effect of variation in water pressure are described, supplemented by two diagrams. A lower water pressure may be required for very porous papers, in which case a fresh calibration curve of the flowmeter is required. E.S.

PHYSICAL TESTING—PAPER—SOFTNESS

BEALL, GEOFFREY, ANDERSON, ROBERT P., and HARVEY, ARLIS A. The error of a nomogram for the calculation of Clark softness. Tech. Assoc. Papers 31: 335-7 (1948); Paper Ind. 30, no. 1: 130, 132 (April, 1948); Paper Trade J. 128, no. 2: 27-8 (Jan. 13, 1949).

A nomogram based on the formula for Clark softness, which has as its basis the Clark instrument used to measure rigidity, stiffness, and softness of paper and paperboard, was developed and its accuracy investigated. It was found that there is little to be gained by employing arithmetic rather than nomographic methods once the physical determinations have been made. The only question is in the realm of convenience, the latter having the advantage of involving something like one-fifth the work of the former. The results also indicated that the determination of Clark softness would be more reliable if only one operator were employed in making the physical tests. E.S.

PHYSICAL TESTING—PULP

VILARS, J. P. Factors influencing properties of mechanical pulp. Tech. Assoc. Papers 31: 420-2 (1948).

A method of evaluation of the quality of groundwood is discussed, based on screen fractionation and a modified tear test. Tests are converted to the same freeness basis and permit the comparison of pulps from varying pulpwoods as well as an indication of the percentage of each type of groundwood permissible in groundwood-sulfite sheets. E.S.

PLASTIC FILMS (NONCELLULOSIC)

ANON. Plastic packages. Dupont Mag. 42, no. 6: 22-3 (November-December, 1948).

A brief illustrated description is given of food packaging with polythene film. Other uses include liners for liquids and chemicals and packages for powders and machine parts. The containers may be washed in soap and water and re-used. The film is moisture resistant, tough and flexible at low temperatures, chemically inert, odorless, and tasteless. Films as low as 0.001 inch in thickness are available. R.R.

FIELD, G. E. Vinyl-nitrile blends. Modern Packaging 22, no. 4: 149-50, 190, 193 (December, 1948); *cf.* B.I.P.C. 18: 616-17.

The most important basic properties of polyvinyl chloride-nitrile rubber blends are greaseproofness; nontoxicity; nonmigratory, nonextractable plasticization; good low-temperature flexibility; good aging; excellent heat stability; excellent processibility; and extensibility with recovery. The author considers Geon polyblend 500 × 503 (a colloidal blend of Geon polyvinyl chloride and Hycar nitrile rubber) and polyblend latex 550 × 20 (a water-dispersed system) which promise much for the packaging field. They can be made by extrusion, calendering, solution casting or coating, and casting and coating from a latex or water-borne system, permitting the manufacturer to use the most economical process at his disposal to produce

a superior packaging material. Data are tabulated on the physical properties of film produced from the two polyblends. The excellent low-temperature properties of polyblend film make it very applicable to frozen-food packaging. Paper coated with polyblend will remain greaseproof even when creased at −50° F. R.R.

PLASTICS—PAPER-BASE

KLINE, HARRY. Phenol-furfural varnishes for laminates. Tech. Assoc. Papers 31: 333-5 (1948); Paper Ind. 30, no. 5: 775-6, 778 (August, 1948); *cf.* B.I.P.C. 18: 318-19.

This article is identical with the previous reference. E.S.

NAVE, AL. Plastics and the Crosley refrigerator design. Modern Plastics 26, no. 3: 106-9 (November, 1948).

The 1948 Crosley refrigerator has a surprisingly large number of functional and structural parts of plastic. Thirteen parts are of paper-phenolic resin laminates, of which four are structural and nine electrical insulation. Three cellulose acetate parts are also used as electrical insulation. R.R.

PLASTICS—TESTING

GREEN, H. J., JR. Grading of sheet plastics by moisture absorption and insulation resistance measurements. Modern Plastics 26, no. 4: 127, 167-8, 170, 172, 174, 177-8, 180-1 (December, 1948).

The author presents a rapid method for grading plastic sheet, particularly laminated paper-base phenolic sheeting, by continuously measuring the rate and amount of moisture absorption, and correlates moisture-absorption measurements with insulation-resistance measurements. A description is given of the materials, apparatus, and test procedures used. The mechanism of the water absorption is indicated by $W = Ct^{1/4}$, where W is the percentage weight increase, t the time, and C a constant. The absorption mechanism is such that a straight-line relationship exists on a log-log plot when the percentage moisture absorption is plotted against time, provided that the sheet area is large in comparison with the edge area. The straight-line relationships can be used to predict the water content of materials exposed to a fixed R.H. and a constant temperature for a given length of time, if the time period is less than that required for the sample to reach equilibrium. The water transferred through the surface of the plastic sheet is approximately inversely proportional to the thickness of the sheet for samples 0.030 and 0.060 inch thick. Insulation resistance is a function of the moisture pickup until the sample reaches equilibrium, when the value becomes almost constant for the phenolic samples. For cellulose acetate samples, the insulation resistance drops until the equilibrium with the moisture in the testing chambers is obtained, after which a temporary leveling off occurs for about 24 hours, followed by a further decrease and a new equilibrium point. 12 figures. R.R.

POLYMERIZATION

SPURLIN, H. M. Polymer solutions. J. Polymer Sci. 3, no. 5: 714-34 (October, 1948).

The purpose of the present review is to give a qualitative picture of the reasons for the solubility of polymers and to discuss the influence of the nature of the polymer and the composition of the solvent on the properties of the solutions. The subject is discussed under the headings: flexibility of

molecules, polymer solubility as liquid-liquid miscibility, crystalline polymers, forces between polymer molecules, solvation, mixed solvents, solubility of polymers in aqueous media, thermodynamic relationships, variation of solubility with molecular weight, gelation and association in solution, degradation in solution, evaluation of solvent power, and alteration of polymer to secure solubility. There are no unusual principles involved in polymer-solvent interaction. All of the observed facts can be interpreted on the basis that, in a polymer molecule, there are many units of structure, possibly differing in chemical nature, that are constrained to remain in their original linkages to one another, but are otherwise free to move independently. The interaction of solvents with these units of structure will be very similar to that of low-molecular substances. However, because of the constraints imposed by the linkages between units and the fact that samples of polymer contain molecules of differing size, many phenomena (such as crystallization and phase-rule behavior) of polymer systems differ quantitatively from those observed with small molecules. These phenomena need much more study, with polymers as well as with low-molecular substances. 44 references. E.S.

POWER TRANSMISSION

STANIAR, WILLIAM. Choosing the correct mechanical transmission method. Paper Mill News 71, no. 50: 82-5 (Dec. 11, 1948).

The efficient operation of any plant is possible only when the correct methods of transmitting power mechanically are employed. There are two general systems of modern mechanical power application, the flexible and the rigid system, each system being further subdivided into various methods. The flexible system methods are shock absorbing and tend to reduce the effect of load impact and vibration, whereas the rigid system methods localize shock and vibration which must be taken by the transmission and driven equipment. The correct application of methods belonging to either system are discussed, including the selection between group and individual driving and the troublesome problem of a high starting torque, the force required to translate a body from a state of rest to one of motion. A mechanical device known as mechanical slip-ring starter is recommended for high starting torque service; by means of slipping friction it automatically starts machinery smoothly and with uniform acceleration. E.S.

PRINTING AND PRINTER'S INK

ANON. Britain's premier publishing and printing organisation, H.M. Stationery Office. Paper Making and Paper Selling 67, no. 3: 18-22 (Autumn, 1948).

H.M. Stationery Office does both Parliamentary and non-Parliamentary printing, both of which are discussed in some detail. The paper used includes printing, art, writing, manila, and cover papers, all of which are purchased directly from mills which produce according to H.M.S.O. specifications. In 1947, the Office used 59,700 tons of paper, about 2.8% of the total amount used in the United Kingdom. Printing is done chiefly by the organization's own presses, and is decentralized as much as possible to avoid unnecessary transportation. The binding is done by outside contractors when it is considered desirable. Announcements of new items are made by the British Broadcasting Corporation and put in appropriate trade journals; review copies are distributed to the press. R.R.

DUFFIE, E. R. Relation of paper and ink in high speed printing. Tech. Assoc. Papers 31: 286-8 (1948).

The author discusses the problems caused in high-speed letterpress printing by rolls which are not mechanically perfect, such as uneven winding, slime holes, calender cuts, hair cuts, improperly made splices, cracked edges, soft areas, scrap in the roll, rolls that are not perfectly round, damaged cores, loose coating that will cause dusting, and hard lumps of foreign materials embedded in the surface; each of these imperfections can cause a shutdown of the press. The most important paper characteristics for a good printing sheet on a high-speed press are discussed under a high degree of smoothness (degree of levelness of the surface, rate of ink absorption, and amount of resilience in the paper) and resistance to picking. There are, of course, other printing requirements for paper; however, these are not different from those used in printing at much slower speeds and are not included here. E.S.

HEALY, A. C. Mottle. Am. Ink Maker 26, no. 12: 35, 37 (December, 1948).

Mottle, resulting when the ink does not print uniformly on the solid areas, may be manifested in variations in depth of color or in mat and glossy patches. The cause may be ink consistency, the nature of the vehicle and pigments, the amount of ink carried, incorrect printing pressure, defective rollers, etc. Its cure usually involves adjustment until the proper combination of these factors is found. It is more apt to occur on platen than on cylinder presses and can sometimes be alleviated by the use of soft packing or the carrying of less ink. Unevenness in the surface, absorbency, or coating of paper, improper ink formulation, and overprinting are discussed as causes. The occasional tendency of prints made with bronze orange of exhibiting an uneven color is attributed to the loss of moisture upon heating and the subsequent picking up of moisture by the ink at the edges of the sheets in a pile. R.R.

MENNELL, P. B. Print recognition. Paper Making and Paper Selling 67, no. 3: 26-8 (Autumn, 1948).

In the identification of printing processes by examination of the printed sheet, the minimum requirement is a magnifying glass. The author discusses letterpress, lithographic, and photogravure printing and the characteristics of each, including photomicrographs to illustrate his points. Collotype is briefly mentioned and also illustrated. R.R.

RAYON—VISCOSE PROCESS

AMÉEN, WALTER. Dissolving pulps. Cellulosa och Papper, SPCI 1908-1948: 258-94 (1948). [In Swedish; English summary]

The author presents a historical review of the development of the manufacture of rayon pulp since 1904, when viscose pulp was produced for the first time at Bøhnsdalen in Norway. The manufacturing technique during the early twenties is described, when the production of rayon pulp began to be an important industry. Extensive statistical data (many of them based on material published in *Rayon Or'ganon*) concerning the production and consumption of dissolving pulps and cotton linters throughout the world are given. Price trends of viscose pulp and technical developments of recent years are discussed. 25 references. E.S.

PRESTON, J. M., and BHAT, R. V. Viscose rayon fibres. I. Swelling anisotropy and double refraction. J. Textile Inst. 39, no. 6: T211-17 (June, 1948).

Viscose fibers were specially spun with widely differing degrees of orientation, and comparisons were made between the orientation parameters derived from swelling and double refraction studies, particularly for elucidating the skin effect. The results obtained indicate that the swelling anisotropy is controlled mainly by the skin structure, whereas the double refraction is characteristic of the core. Preliminary measurements on viscose fibers spun into ammonium sulfate coagulating baths show some differences from the behavior of the present fibers which were spun into a sulfuric acid, sodium sulfate, and zinc sulfate bath. It is suggested that the ammonium sulfate fibers are more homogeneous, but further work is planned to settle this point. 20 references. E.S.

RINGSTRÖM, E., and APLER, N. H. Swelling and floating tendency of pulp sheets at steeping in the viscose process. Svensk Papperstidn. 51, no. 21: 501-8 (Nov. 15, 1948). [In English; German and Swedish summaries]

An investigation of the steeping process in the preparation of alkali cellulose from pulp sheets has been made on a laboratory scale. To obtain a uniform product in the mill it is important to be able to calculate the swelling space required for free contact with the caustic solution at all times, and to avoid floating of the sheets in the press which may result in nonuniform wetting and uneven pressing. Two standard methods for determining the swelling behavior of pulp sheets have been critically examined. It is concluded that both are inadequate because the influence of the rate of adding the caustic solution has not been taken into consideration. A new method developed by the authors is described, and data are given on the specific swelling volume and the floating tendency at different filling rates. As the rate of caustic addition increases (and the difference in caustic level inside and outside the pulp sheets decreases), there is an increase in swelling until a maximum is reached; thereafter, the swelling decreases until it becomes constant at the point where the rate of filling is such that the alkali level inside and outside the pulp sheets is the same. This is interpreted as showing that, at lower rates of filling, the absorption of alkali from solution by cellulose lowers the concentration of the solution in contact with the sheets below the maximum swelling concentration (about 10%). However, as the filling rate increases, the concentration of caustic solution in contact with the sheet increases until the maximum swelling concentration is reached, after which the swelling decreases because of the decreasing swelling ability of the more concentrated solutions. With increasing rates of filling, the floating pressure of the sheets passed through a maximum and then a minimum. It is shown that these differences are caused by occluded air. At low rates of filling this air may be drawn in from the atmosphere because there is not sufficient caustic solution available to fill the expanding fiber interspaces. At high rates of filling the air initially present in the fiber structure does not have time to escape. The authors believe that an optimum speed of introduction of caustic solution into the press (appreciably higher than commonly used) offers a possibility of obtaining a more uniform alkali cellulose with considerable savings of time in the steeping process. M.A.H.

SAMUELSON, OLOF. Studies of the chemistry of the viscose process. Cellulosa och Papper, SPCI 1908-1948: 295-325 (1948). [In Swedish; English summary]

With frequent reference to the work of other investigators, the author presents the results of his own experiments and their interpretation of (*a*)

the chemical reactions involved during the xanthation and ripening of viscose; (*b*) the colloid-chemical reactions during xanthation, dissolving, and ripening of viscose; and (*c*) the degradation of cellulose during the viscose process. 62 references. E.S.

SCHRAMEK, W., and STENZEL, ANNELIES. The swelling and solution mechanism of xanthated alkali cellulose fibers. Melliand Textilber. 28, no. 11:383-8; no. 12: 420-7 (November, December, 1947). [In German]

A series of 39 photomicrographs is reproduced showing, by means of swelling, details of the supermolecular structure of different regenerated cellulose rayon fibers. Included are Sedura, Vistra HB, standard B staple fiber, Duraflox, Schwarza W1, Lanusa, Cuprama, and a special fiber produced in the authors' experiment station by a stretch spinning process. The data are utilized to seek, and explain theoretically, relationships between fiber properties and fiber structure and ripening and spinning conditions. It is assumed that, in a freshly prepared cellulose solution, the final dispersal of the native cellulose aggregates has not yet taken place and that it continues into the ripening process. The dispersed units, however, tend to agglomerate again into larger aggregates as ripening proceeds. During ripening the viscosity of a normal viscose solution first decreases, remains stationary at a minimum value for a short interval, and then increases rapidly. The possibilities of different kinds of reaggregation of the molecules or groups of molecules under various industrial spinning procedures are discussed. Sedura, a special Lilienfeld process fiber spun from partially ripened viscose with rapid coagulation, for example, has the highest strength properties, and it is shown that its fibrillar structure most nearly approaches that of a macromolecular structure. The solution process of such a fiber shows only a continuous diminution in size and final disappearance of its fine fibrillar structure. Lanusa, which also possesses a fibrillar structure, is considerably lower in tenacity, although superior in elasticity. It is postulated that, in this case, the ripening has proceeded further in the building up of larger aggregates and that during spinning these coagulated aggregates combine in more of a fringe-like arrangement. Fibrils of this type show cleavage planes during solution. The effect of slower coagulation, as in stretch spinning, is considered, and also the correlation between the type of supermolecular structure and the resistance of the fiber to chemical attack. 13 references. M.A.H.

TEUNISSEN, P. H. Distribution of the chain lengths of the cellulose and viscose filtration. Svensk Papperstidn. 51, no. 21: 497-500 (Nov. 15, 1948). [In English; Swedish and German summaries]

If the volume of filtered viscose is determined after various times and t/V plotted against t (V being the volume in cc. filtered per sq. cm. of filter area in t minutes), after some time the points form a straight line. The steeper the slope of this line, the more quickly the filter clogs; therefore, the tangent of the angle of inclination is characteristic of the filtration and this tangent, multiplied by 100, is called the clogging factor. The influence of chain-length distribution of the initial wood pulp on this clogging factor has been examined. Normally aged alkali cellulose was compared with a mixture of alkali cellulose which had been aged for a very long time and some which had not been aged at all. The latter gave a distribution of chain length in which more short and more long chains occurred than in

a normally aged alkali cellulose, whereas the percentage with an intermediate D.P. (between 100 and 300) was appreciably lower. The influence of the viscosity on the clogging factor was considered, for it has been shown that the clogging factor is not independent of the viscosity. In the first series, viscose was prepared from normally aged alkali cellulose after various aging times. In the second series, the alkali cellulose aged for a very long time was mixed in various proportions with nonaged alkali cellulose. When the clogging factors of both series were plotted against the viscose viscosity, the points fell on the same straight line. It is concluded, therefore, that the type of chain-length distribution has no influence on the clogging factor. This is not in agreement with the conclusions of Risto Vuori (Thesis, Helsinki, 1947), but the author points out that, in those cases where Vuori found increases in clogging factors as a result of mixing of celluloses, there is always an accompanying increase in viscosity whereas, when mixing alkali celluloses of different degrees of aging, he obtained viscoses with about the same viscosities, the clogging factors also are almost equal.
M.A.H.

RESEARCH

ERDTMAN, HOLGER. The chemistry of the forests. Cellulosa och Papper, SPCI 1908-1948: 148-54 (1948). [In Swedish; English summary]

The author discusses the importance of the organic chemistry and biochemistry of the forests with reference to many problems which have not yet been studied or have been only partially considered. The training of competent research workers in this field—a combination of chemist and biochemist—would be highly desirable. E.S.

RESEARCH LABORATORIES

PRINTING, PACKAGING AND ALLIED TRADES RESEARCH ASSOCIATION. PATRA move to Leatherhead. Paper Making and Paper Selling 67, no. 3: 33-5 (Autumn, 1948).

Following a brief description of the new PATRA research center, mention is made of the work being done on packaging, printing papers, printing troubles, and bookbinding, as described in PATRA publications. R.R.

PRINTING, PACKAGING AND ALLIED TRADES ASSOCIATION. PATRA's new research centre opened. Paper Box Bag Maker 106, no. 5: 176-8 (November, 1948); Paper Market: 128-9, 131 (November, 1948).

Speeches are given which were presented on the occasion of the formal opening of PATRA House at Leatherhead, the new PATRA research center, on October 28, 1948. Illustrations of the building are included.
R.R.

SAVARY, RANALD. An ambitious printing ink research project now in third year of operation. Inland Printer 122, no. 3: 77-9 (December, 1948); Modern Lithography 16, no. 12: 36-7 (December, 1948).

General information is given regarding the projects and accomplishments of the Printing Ink Research Institute, its officers, and supporting companies. R.R.

WALKER, W. C. The Research Institute—its aims and accomplishments. Am. Ink Maker 26, no. 12: 21-3, 55 (December, 1948).

The author considers the main points of some of the more important projects on which the National Printing Ink Research Institute has worked. The establishment of standard test methods, the development of the Grindometer and drying time recorder, and studies on the greasing of lithographic inks, loss of drying on aging, ink viscosity, and the pigment-vehicle relationship in inks are discussed. R.R.

SALESMEN AND SALESMANSHIP

STEIN, ARTHUR H. Sell pre-packaged food stores. Paper & Twine J. 22, no. 9: 9, 11-12 (November, 1948).

A general summary is given of the results of prepackaging in grocery stores, the fundamentals of a successful self-service prepackaging operation, and the necessary supplies and equipment. Paper salesmen must be familiar with the various phases of prepackaging if they are to make and keep customers in this field. R.R.

SALT CAKE

HOLLAND, A. A. More Saskatchewan salt cake. Chem. Eng. 55, no. 12: 121-2 (December, 1948).

An outline is given of the operations at the new Chaplin plant in the province of Saskatchewan in western Canada, which started production in May, 1948; it is drawing on the world's largest natural deposit and is designed to produce up to 150,000 tons of 98.5-99.5% salt cake yearly. The major markets are the kraft paper and synthetic detergents industries. Although salt cake consumption by Canadian sulfate mills is being rapidly increased from 106,000 tons in 1947 to an estimated 151,000 tons in 1949, there will probably still be about 148,000 tons of Canadian production (resulting from the six plants producing natural sodium sulfate) available for export to the United States. E.S.

SHIPPING CONTAINERS

ANON. New package for bulk hard candies prevents moisture damage. Packaging Parade 16, no. 191: 73 (December, 1948).

A corrugated shipping container and an asphalt-laminated kraft liner are used with an insert of a cloth bag of Desiccite No. 25 for packaging bulk hard candies to keep them in an atmosphere containing about 1% moisture. The dehydrating agent, prepared from naturally occurring montmorillonite, is inert and nontoxic. R.R.

ANON. Packaged Christmas trees. Packaging Parade 16, no. 191: 56-7 (December, 1948); *cf.* B.I.P.C. 18: 324.

The G. D. Martin Co., Olympia, Wash., is marketing Douglas fir trees in a compact corrugated shipping container. The base of the tree is put into a metal cannister filled with peat moss to supply moisture. Trees are pushed into the carton through a sheet metal funnel which compresses the branches. Special cold-waxed paper inserts are placed inside at the ends of the container, and the outer flaps are stapled over the inserts to form a strong end seal. R.R.

ANON. Safe shipments for safety glass. Packaging Parade 16, no. 191: 58 (December, 1948).

Chevrolet safety glass is being shipped in corrugated paper cartons which give more prominence to the "handle with care" warning, have the word "glass" printed on each of the four narrow panels as well as on the large panels, and afford better protection through the use of a separate two-piece liner section. The glass is protected on all edges and sides by two layers of corrugated paper. On the large panels, there is a considerable air space for added cushioning. R.R.

CRITERION PAPER CORPORATION. *Laminite Products Division, New York.* Laminite channel boxes—new corrugated use. Fibre Containers 34, no. 11: 64-6 (November, 1948).

Laminite corrugated channels are made of single-face corrugated board formed into U-shaped channels, usually of three thicknesses of single face, with the flutes of the single face on the inside of the channel exposed or covered as desired. The channels are hardened chemically to increase their rigidity and strength; the moisture content is also lowered, reducing the weight of the material to a minimum. The material is little affected by high and low temperatures, is water and oil repellent, and may be given an antitarnish treatment. The channels, made in lengths up to 21 feet and 4 inches and in inside widths of 6 to 10⅜ inches, nest compactly for storage or shipment. The ends are closed with wood secured by nailing. One filled channel with wood ends may be closed with another that telescopes partially or fully, the whole then being secured with steel strapping. A wood board nailed to the wood ends and then securely strapped provides an alternative closure. The container may be used to carry finished or unfinished metal parts, nuts and bolts, drills, small mechanical assemblies, metal hose, linoleum, etc. Windshield glass, mirrors, etc., are being shipped with the channels covering the exposed edges and corners; the flat surfaces are protected with other material, and a closure is made with steel straps. R.R.

LUKE, GEORGE W. Peaches packed like cupcakes. Packaging Parade 16, no. 191: 39 (December, 1948).

Tests at the New Jersey Agricultural Experiment Station indicate that crinkle cups similar to those used for baked goods will protect packaged peaches from bruising, confine brown rot to a single peach, and bring a higher price. When the fruit is packed on its side, its high color shows up particularly well against the green cups and gives extra sales appeal to the cellophane-window carton used for retail trade. For the wholesale trade, the peaches are boxed in three layers, separated by cardboard and with the upper two layers supported partly by two vertical partitions. Further study of the pack is urged. R.R.

SHIPPING CONTAINERS—FROZEN FOODS

ANON. One-piece, heat-seal carton. Modern Packaging 22, no. 4: 104-9 (December, 1948).

Seabrook Farms is now using a new carton for frozen peas and lima beans, which may fill the packaging needs of frozen food manufacturers. It is a one-piece full-seal-end box of white manila-backed board coated with a transparent glossy thermoplastic, which provides a heat seal (but will not block at temperatures up to 115°F.), gives a nontoxic, tasteless, and odorless surface in direct contact with the food, and is an effective water and water-vapor barrier. A recent test comparison of sealed frozen food packages of various types under similar laboratory conditions showed that the new wax-

resin-polymer combination transmitted only half as much water vapor as the most effective of the conventional packages. The package also has possibilities as a container for dry hygroscopic products, such as cereals, prepared mixes, and dessert powders. The coating, called Darex, is applied to the flat stock after it has been printed, cut, and scored. It will not crack at the corners and has sufficient flow under heat during the setting-up process to fill any corners or cracks. Special machinery sets up the cartons from blanks by heat sealing; other equipment includes a conveying and feeding unit for empty cartons and a new type of filler and sealer. A description is given of the operational details, and of water-vapor, taste, and odor tests of the carton. R.R.

ANON. Product realism in pictures features Blue Goose frozen foods packaging. Packaging Parade 16, no. 191: 38, 70 (December, 1948); *cf.* B.I.P.C. 19: 148-9.

The American Fruit Growers, Inc., Los Angeles, has carried out a full-scale program of package development for frozen foods, including tests of packaging materials and types of containers, cost analyses, and marketing tests. The carton chosen is a moistureproof container with a cellophane or wet-strength paper lining and a 300 MSAT Cellophane overwrap. It was found that attractive faithful reproductions of the product on the exterior of the wrap increased sales three to five times, and that a white background on the wrap gave a feeling of cleanliness and purity. Natural color photographs of the contents are reproduced on the wrap by a six-color rotogravure press in a way to give the illusion of a window through which the food may be seen. An illustrated description of the package is given. R.R.

SHIPPING CONTAINERS—LOSS AND DAMAGE CLAIMS

LYONS, IRVING. Responsibility of shipper for adequate containers. Fibre Containers 34, no. 11: 73-4 (November, 1948).

The shipper, who is as responsible as the carrier for the safe arrival of his merchandise at the market, can select his container on the basis of experience or laboratory tests. In addition, he must comply with classification rules for rail shipment. He must select a container that is not susceptible to damage with ordinary transportation handling, but cannot be expected to provide a container that will stand rough handling in transit. Periodic surveys should be made to secure information regarding the physcial condition of the product at the final outlet where the consumer makes his choice. It is also the duty of the shipper to see that the cars are loaded properly. Specific requirements should be made when containers are ordered, based on tests and follow-up procedures to ascertain that specifications have been met. Palletizing, which minimizes the handling of goods, reduces damage, and its cost should be shared by carriers, who also benefit from the practice. Shippers who use containers that are heavier than those of a competitor in order to lessen loss and damage in transit should be rewarded by freight rates computed on the same basis as the competitor's. R.R.

SHIPPING CONTAINERS—TESTING

LINCOLN, W. B., JR. A progress report on the testing program of the Shipping Container Institute. Paper Trade J. 127, no. 23: 67-70 [T.S. 508-11] (Dec. 2, 1948); Tech. Assoc. Papers 31: 189-92 (1948).

The Shipping Container Institute was organized for the purpose of con-

ducting research and accumulating technical data on all phases of the manufacture and use of fiber shipping containers. This report is concerned with investigations which have been in progress for the last couple of years on the performance of fiber boxes. Performance tests have been developed within the industry to evaluate the ability of the container to perform satisfactorily in service. No one test is adequate and the author stresses that all results should be concerned with the properties of a loaded container in relation to the commodity to be shipped. A preliminary report is given of the results of a shipping test program. Reported causes of damage to shipments are presented, together with a breakdown showing the causes considered to be primarily the responsibility of the boxmakers, shippers, and railroads, individually and collectively. A shipping code is recommended, the adherence to which will reduce the number of claims now being made. E.S.

ROMNEY, W. L. Control of container quality. Am. Boxmaker 37, no. 12: 17, 34-5 (December, 1948).

The author discusses control of container quality from the user's viewpoint, with emphasis on performance standards. It has been found that solid printing, wide scores and fingerlings, and poor liner glueing all contribute to poor compressive strength of containers, and that physical container board specifications do not necessarily guarantee a container with satisfactory compressive strength. By improving this property and maintaining higher standards by periodic tests, package crushing and damage can be reduced and a substantial saving realized by the elimination of support sheets. Performance standards are better for control than detailed specifications of component parts, because they can usually be checked more readily. If performance standards and control testing are adapted to the user's particular needs, he is well on the way to ensuring the satisfactory delivery of his products to the ultimate consumer at a minimum cost. R.R.

SLIME PREVENTION

STRANDSKOV, F. B. Slime-forming organisms. J. Am. Water Works Assoc. 40, no. 12: 1299-304 (December, 1948).

Micro-organisms can be very troublesome in industrial processes because of their ability to produce large quantities of slime. This is not a property of a few but probably of all micro-organisms when the environmental conditions are favorable. Such factors as temperature, nutrients, and concentration of electrolytes affect this property in some organisms, and it is reasonable to expect, because of the similarity in the physiology of micro-organisms, that this will hold true for all micro-organisms. The microbiological slime-producing potential of water supplies cannot be definitely determined by ordinary laboratory techniques because of the wide variation in nutritional and temperature requirements of micro-organisms. If a non-specific sterilizing agent is being used, the counts on nutrient agar before and after treatment are, however, indicative of the degree of sterilization. In the investigation of industrial slimes, a clearer microbiological picture can be obtained by direct microscopic examination than by attempting to culture the material on laboratory media. If the responsible organisms are found to be bacteria, their Gram reaction should be determined because of the difference in resistance of the two types to some disinfectants as well as the difference in the type of capsular material produced by the aerobic Gram-positive spore formers that have been studied. This information can be helpful in selecting the type and quantity of disinfectant to be used, although variations in such factors as pH, temperature, and organic matter

content, all of which affect the activity of disinfectants, make it impossible to state that a certain dose of any chemical will control the growth of a particular organism in all industrial systems. E.S.

SOLVENT CLEANING

LOUCKS, C. M., and GROOM, C. H. Chemical cleaning of heat exchange equipment (abridged). Paper Trade J. 127, no. 25: 26-31 (Dec. 16, 1948).

The use of chemical solvents in cleaning heat exchange equipment is described on the basis of the types of deposits, the solvents available, and the metals encountered. The application of the solvents is discussed and a number of case histories described, illustrating chemical cleaning in various industries. It is logical to expect heat-exchange surfaces to experience some degree of fouling. When the fouling becomes serious enough to cause appreciable loss in efficiency of heat transfer, some measure of corrective maintenance is necessary. The authors describe the use of chemical solvents for removing the offending deposits and restoring the equipment to satisfactory performance. The successful and economic application of solvent cleaning depends upon a number of factors—namely, the deposits, the metals in the unit to be cleaned, the solvents available, and safe operating practices. These factors are discussed as they influence solvent cleaning and methods of application are described by citing experiences with solvent cleaning in various industries. 14 references. E.S.

STARCH

POTTER, A. L., and HASSID, W. Z. Starch. II. Molecular weights of amyloses and amylopectins from starches of various plant origins. J. Am. Chem. Soc. 70, no. 11: 3774-7 (November, 1948); *cf.* B.I.P.C. 19: 274.

The number-average molecular weights of six amylose and five amylopectin components of starches from different plant sources were determined by osmotic pressure measurements. The number-average molecular weights of the amyloses ranged from 100,000 to 210,000; the amylopectins ranged from approximately 1,000,000 to 6,000,000. Comparison of the molecular weights determined by osmotic pressure measurements with those estimated from the chain-length values found by the periodate end-group method indicates that, in some amyloses (potato and Easter lily), single molecules constitute single chains. In other amyloses, two or three chains may be linked to form one amylose molecule, indicating the possibility of a slight degree of branching. 14 footnotes. E.S.

RANDOLPH, THERON G. Corn starch as an allergen; sources of contact in food containers. J. Am. Dietet. Assoc. 24, no. 10: 841-6 (October, 1948).

Cornstarch is used as a sizing for many types of paper and cardboard and to dust the surfaces of certain plastic wrappers used in dispensing common foods. Foods having a moist or liquid phase in contact with such containers may become contaminated with corn as a result of this common practice. Many highly corn-sensitive patients, who are otherwise free from exposure to corn, will react with unquestionable symptoms to the ingestion of milk dispensed in paper cartons or to the ingestion of any other food which has stood with a liquid phase in contact with a starched surface. The practices of waxing containers are effective to various degrees in covering a starched

sizing. Adequate treatment of corn sensitivity not only requires the avoidance of foods containing corn, but also entails the use of corn-free containers and dispensing utensils, such as cups, plates, spoons, and so on, when dealing with foods having a moist or liquid surface phase. 12 references. E.S.

STATISTICAL METHODS

DRESHFIELD, ARTHUR C. An application of statistical methods to the control of thermoplastic coating and laminating processes. Tech. Assoc. Papers 31: 315-18 (1948); *cf.* B.I.P.C. 18: 708-9.

Several examples of the application of control chart methods to the converting operations of waxing and laminating are given. Suitable modifications of conventional methods to adapt them to this use are explained. Control charts for both averages and range are given with details for preparing the data worked out. E.S.

STRIEBY, J. G. The inspection specification as a quality contract. Paper Trade J. 127, no. 24: 60-6 [T.S. 515-21] (Dec. 9, 1948); Tech. Assoc. Papers 31: 224-30 (1948).

The concepts and methods which have grown out of the applications of statistical methodology to quality system problems provide economic and objective means for observing and describing quality. One of the most useful devices thus made possible is the inspection specification, a quality agreement or contract which states in an unambiguous manner the amount and kind of evidence accepted as demonstrating that a lot of goods does or does not conform to the agreement. Its approach is realistically factual and its statements are operationally verifiable in terms of sampling systems which provide for both consumer and producer the degree and type of protection compatible with economic considerations. Buying and selling under the terms of inspection specifications is on a harmoniously enlightened basis not otherwise possible. The author discusses the philosophies and concepts of inspection specifications and the devices by which they attain their objectives. The essential parts of the specification are listed and commented upon. To illustrate the discussion, a hypothetical specification is submitted together with operating characteristic curves and a description of steps in preparing and evaluating a specification. 31 references. ES.

STEAM POWER

ANON. Combustion engineering steam generating units. Paper Mill News 71, no. 50: 50, 52 (Dec. 11, 1948).

Illustrations are given of six Combustion Engineering steam generating units, which have recently been installed in five paper and board mills of the United States and one straw paper mill of Argentina. E.S.

ANON. New power plants and new equipment for pulp and paper mills in United States and Canada. Paper Mill News 71, no. 50: 42-3, 89 (Dec. 11, 1948).

A list is presented of new power plant facilities of mills coming into operation in 1948 and of modernization programs of existing mills which were carried out during this period. E.S.

BEST, PHILIP F. Combustion ash collection for the small power plant. Paper Mill News 71, no. 50: 92-4 (Dec. 11, 1948).

There has been a tendency in the past for the small power plant owner and operator to give scant, if any, consideration to the separation of ash from combustion gases. A careful consideration of all factors (constantly changing smoke and dust codes enacted by various municipalities, good will of the nearby residents of the plant and the community as a whole, elimination of product contamination in certain industries, such as the paper and synthetic fiber industries, etc.), will, in most cases, justify the installation of an efficient dust collecting system, regardless of the type of firing and the size of the installation. Data collected on ash emission from pulverized-fuel and stoker-fired installations are included. E.S.

BOHN, R. G. New boiler plant serves Michigan Carton Co. Industry and Power 55, no. 6: 74-6 (December, 1948); *cf.* B.I.P.C. 19: 229.

An illustrated description is given of the entirely separate boiler house built to serve the Michigan Carton Co.'s second folding boxboard mill in Battle Creek. Two stoker-fired one-drum completely water-walled units, each with a rating of 60,000 lb./hr., have already been installed. During the warmer seasons, the entire load can at present be supplied by one boiler; however, with increased production and severe winter loads, both will be needed. Provision for a third unit for standby capacity has been made. The plant has been designed to burn a wide variety of coal, especially those from nearby Indiana and Illinois seams. E.S.

ROGERS, L. B. Champion-International adds 70,000-lb-per-hr boiler. Paper Mill News 71, no. 50: 57-8, 60, 62, 64 (Dec. 11, 1948).

After briefly referring to the company's policy of power plant development since 1928-29, the new 70,000-lb./hr. Riley steam generating unit is described, which was installed in 1947 by the Champion-International Co. of Lawrence, Mass. It is equipped for firing by pulverized coal or oil and generating steam at 400 p.s.i. Supplemented by diagrams of the old and new boiler house, the details of the new unit are discussed, including coal and ash handling and feedwater treatment. A list of principal equipment is appended. E.S.

WAGNER, H. L. Application of bituminous stokers. Paper Mill News 71, no. 50: 36-8, 40 (Dec. 11, 1948).

The author outlines the different phases to be considered in the selection of coal-burning equipment for obtaining the maximum efficiency and satisfactory operation, utilizing the source of coal closest to the plant. It is also shown that the stoker and furnace design can be selected in such a manner that they will handle satisfactorily a wide range of fuels, so that the ultimate user is not tied down to one particular source of supply. Emphasis is placed on the fact that a complete study of the problem at hand should be made before coal-burning equipment is selected and purchased. E.S.

STRAINS AND STRESSES

MEREDITH, R. Relaxation and flow in cellulose fibres. J. Textile Inst. 39, no. 7: P245-51; discussion: P251-2 (July, 1948).

The molecular approach of the stress-strain-time relations in fibers is considered. The first section is concerned with an outline of Eyring's theory of rate processes applied to flow in textile fibers. This is followed by sections

on stress relaxation and creep of cotton, viscose rayon, and acetate rayon and a short section on stress-strain curves. Finally, the effect of rate of loading on the stress-strain of cotton is considered in the light of the activation energies calculated from the stress relaxation. Eyring's theory as applied to cellulose fibers is quite successful in explaining the shape of creep curves, relaxation curves, and stress-strain curves up to the point where permanent structural breakdown takes place. The theory also enables stress-strain curves at one rate of extention (or rate of loading) to be calculated from those at another rate of extension. The determination of two curves at different rates of extension permits the activation energy to be calculated from the ratio of the stresses at a given strain. E.S.

STREAM POLLUTION

TULLY, JOHN P. Prediction of pulp mill pollution. Western Pulp and Paper 1, no. 5: 6-9, 30-3 (December, 1948).

It has recently become possible to establish a measure of industrial pollution and, in the case of the pulp industry, to predict the state likely to result from a given development. This makes it feasible to effect efficient adjustments while the mill is still in the planning stage. Where fish mortality indicates excessive pollution from an operating mill, it is advantageous to determine the degree in order to estimate the extent and nature of the necessary corrective measures. The risk of pollution and damage to salmon fisheries on the West Coast occurs when pulp mill waste is discharged into a waterway where dilution is limited. With the aid of equations, tables, and charts, the author establishes a quantitative measure of pollution, defines the tolerable limits, and shows how they may be evaluated either before or after pollution occurs in an inlet or river. The application of these principles is illustrated by the example of a typical 135-ton sulfite mill discharging into an adjacent river. The calculations indicate that the limiting tolerable degree of pollution may be expected when the river discharge is 1710 cu. ft./sec. at the millsite. The probability of this condition occurring during the entire year must then be determined from run-off records. A more complex situation exists when the pulp mill discharges its effluent into a confined seaway, such as an inlet or bay, a problem facing Bloedel, Stewart & Welch prior to constructing their mill at Alberni Inlet on the west coast of Vancouver Island. The Somass river discharges into this inlet, the water moving back and forth with the tide, progressing slowly seaward. When the river discharge fell below 1600-1800 cu. ft./sec. —as it does every summer—the critical relation would be reached and operation would have to be curtailed. This could be obviated by storing water in the lakes at the head of the river to maintain uniform flow during the entire year or by storing the concentrated blow-pit liquor in ponds during the summer months, to be released during the winter when the river was high. The third possibility and the one actually selected by the company was the construction of a sulfate mill from which the discharge is so small that its oxygen demand can be tolerated at the lowest river levels. E.S.

SULFITE PROCESS

NEVRELL, TORE H. The by-products of the sulfite industry. Cellulosa och Papper, SPCI 1908-1948: 374-97 (1948). [In Swedish; English summary]

The author reviews developments in the manufacture of by-products from the sulfite industry, with particular reference to the production of sulfite alcohol, fodder yeast, and fuel, and possible combinations of these methods.

The number of sulfite alcohol mills in Sweden has increased to 34, which represents 80% of the capacity of the country's sulfite industry. Other developments and possibilities are mentioned briefly, such as compressed yeast, road binders, cymene, and the possible utilization of the cinders from burning pyrites. 72 references. E.S.

SULFITE PROCESS—NEUTRAL

KASSER, A., and ROSSIGNOLI, P. The manufacture of pulp from annual plants by the neutral sulfite process. Papeterie 70, no. 9: 279-85; no. 10: 307, 309-11, 313-14; no. 11: 346-7, 349-51 (September-November, 1948). [In French]

The chemical composition and fiber dimensions of various annual plants are treated briefly, as are such cooking agents as chlorine, caustic soda, nitric acid, calcium bisulfite, and sodium sulfite. Despite the higher cost of chemicals, the neutral sulfite process (I) appears to be the most feasible economically, especially for small French mills with outputs of 5-20 tons/24 hours. Straw appears to be the most favored raw material, but cooking schedules are also given for sorghum, esparto, and alfalfa, and the effects of temperature and pressure, cooking time, liquor composition and ratios, and bleach consumption are discussed at some length. The cost of cooking with (I) is compared with that of other procedures. Two diagrams show the sequence (in a 10-12 ton mill) using (I) to produce bleached and unbleached bagasse pulp, from the initial cleaning of fiber to the final bleach and washing stages. All operations are described quite fully and attention is also given to accessory installations, water and power consumption, floor space, and labor requirements. L.E.W.

TANNING

GUSTAVSON, K. H. The accessibility of protein groups, an important factor in reactions of collagen with high-molecular compounds. Svensk Kem. Tid. 60, no. 10: 200-7 (October, 1948). [In English]

A high molecular-weight fraction of lignosulfonic acid (I) prepared by dialysis contained 6.6% sulfur and 10.8% methoxyl and had an equivalent weight of about 480 and an average molecular weight of 8000. The reaction of (I) with collagen (American standard hide powder) and with collagen pretanned with wattle bark tannin was investigated. (I) combined with essentially all the basic groups of untreated collagen, but combined with only one third the basic groups available in the vegetable tanned leather. This was explained as an indirect blocking of the basic groups by the tannin molecules. A similar hindrance is offered to the introduction of highly aggregated chromium compounds, but there is no hindrance to the introduction of smaller molecules, such as hydrochloric acid and simple basic chromium salts. The author concludes that the irreversibly fixed (I) has an equivalent weight of about 500, whereas the loosely bound (I) has an equivalent weight of about 3000. This means that all the sulfonic groups in the irreversibly fixed (I) are combined with the protein, but that only 3 out of 16 sulfonic groups of the loosely bound (I) are combined with the basic groups of the collagen. 18 references. M.A.B.

TESTING, GENERAL

SCRIBNER, B. W. Developments in testing of paper and paperboard—1946-1947. Paper Trade J. 127, no. 27: 53-5 [T.S. 538-40]

(Dec. 30, 1948); Tech. Assoc. Papers 31: 322-3 (1948); *cf.* B.I.P.C. 17:730.

A resume of general developments in the testing of paper and paperboard is given for the period from November, 1946, to October, 1947, inclusive, under the headings: general physical properties, permeability, chemical, microscopy, optical, testing related to specific products, and general. 45 references. E.S.

WALKER, W. C. Standardizing test methods. Am. Ink Maker 26, no. 11: 31, 61 (November, 1948).

The author discusses the standardized test methods which will be developed through the technical committee and research staff of the National Printing Ink Research Institute to facilitate the interchange of technical information, ink research, scientific control of ink production, and advances in ink technology. The test methods will be divided into three main parts: printing inks, raw materials, and related substances. The qualifications of the methods and procedure for submitting them for consideration are described. A tabulated classification of test methods is included. R.R.

TRANSPARENT CONTAINERS

PENN, W. S. The use of transparent plastic sheeting. Brit. Packer 10, no. 11: 26, 28 (November, 1948); *cf.* B.I.P.C. 19: 183.

Because of the high cost of cellulose acetate, which is the principal kind of plastic sheeting used in packaging, and the expense of assembling the boxes, attention has been directed in America to methods of reducing the latter item by the use of automatic boxmaking machines. By combining cardboard, cellulose acetate, and Scotch tape and by using cellulose acetate-vinyl laminations, which are flexible and can be bent sharply without cracking, manufacturers have developed boxes which can be shipped and stored flat, and are easily set up prior to use. Brief descriptions are given of several packages. R.R.

VOCABULARY, TECHNICAL

ANON. Trend toward definitions. Fibre Containers 34, no. 11: 54, 56, 60-3 (November, 1948).

A review is given of the "Glossary of packaging terms," published by the Packaging Institute and the "Definition of terms pertaining to shipping containers and related items," which will be published by A.S.T.M. Committee D-10, Sub-Committee I. The latter is reproduced in the hope that comments will be forthcoming which will help in the further clarification of the definitions before they are published in final form. R.R.

WASTE PAPER

VAN DER WERTH, ALBERT. Regeneration of printed and other waste paper (a review of German patents). Das Papier 2, no 17/18: 327-35 (September, 1948). [In German] *cf.* B.I.P.C. 19: 205.

A review is presented of 45 German patents dealing with the recovery of waste paper by means of alkalies, nonalkaline emulsifiers, waste liquors of the paper industry, solvents alone and in combination with emulsifiers, and by covering the printing ink. L.E.W.

WET STRENGTH

ANON. Amberlite W-1 increases dry strength of paper. Resinous Reptr. 9, no. 6: 13 (November, 1948).

The dry strength of tub-sized 100% sulfite paper increases from about 5 lbs./inch width to over 10 lbs. with the addition of 5% Amberlite W-1. Best results are obtained when the resin solution is sprayed on the wet paper web. However, if this is not practical, the solution may be applied at the size press or calender stacks. The resin is fully cured after two or three days' aging at 75° F. In addition to increasing the dry-strength characteristics of paper, Amberlite W-1 also improves pick resistance, fold, abrasion resistance, sizing, and wet strength. R.R.

ANON. Wet strength—new twist in tissue. Resinous Reptr. 9, no. 6: 12-13 (November, 1948).

Twisting tissue is a very light-weight sheet, with a basis weight of about 15 lbs./ream. The paper is made on a cylinder-type machine to give high strength in the machine and low strength in the cross-machine direction. High-grade kraft pulp is used, which is extensively hydrated before sheet formation. Softness and brilliant light-fast colors are important characteristics. For twisting, wide rolls of paper are slit into widths of about one inch. These narrow rolls are dipped into water to increase the pliability of the paper, and the strips are fed directly into a machine for twisting and drying. Because a high wet-strength paper is necessary to eliminate breaks on the machine, Uformite 467, a urea-formaldehyde resin, is added to the pulp before sheet formation. Data are tabulated on experiences in the commercial use of the resin to improve the wet tensile strength of the tissue. R.R.

DIXON, J. K., CHRISTOPHER, G. L. M., and SALLEY, D. J. Fundamental physical-chemical characteristics of melamine resin acid colloid. Tech. Assoc. Papers 31: 412-20 (1948).

Melamine-formaldehyde acid colloid has been studied by a number of physico-chemical methods. The monomer of trimethylolmelamine in solution behaves as a weak base and forms a completely dissociated salt with an acid. The viscosity of the acid solution of the monomer increases with time, suggesting that polymerization is occurring, and the accompanying decrease in pH indicates that the polymer is a weaker base than the monomer. Anions are bound to the polymer, and the extent of binding as a function of the age and concentration of the solution has been examined by conductivity, self-diffusion, and electrical transport methods, the latter two involving radioactive tracer techniques. The strength of binding depends on the kind of anion present, sulfate being more strongly attached than chloride. The polymer in solution has a net free positive charge which decreases with age. On the other hand, cataphoretic and streaming potential measurements indicate that the polymer-pulp adsorption complex has a positive charge which increases with age of the polymer. Combined diffusion and viscosity studies have indicated that the polymer is a cigar-shaped molecule of relatively small size, containing only 10 to 20 monomer units at the most. Electron micrographs tend to confirm this but suggest that the polymer may be somewhat larger. The general picture obtained is that, during polymerization, the monomer units are joined together by splitting out water and formaldehyde, and that they stack up on one another like a pile of doughnuts to form a long cylinder. The bringing together of charged monomer units to form the polymer would result in the development of a high electrostatic charge density. In order to re-

lieve this inherently unstable electrical condition protons are expelled from the polymer and anions are bound. There remains a small net free positive charge on the polymer, which varies with age, concentration, etc. The relationships of the above physical-chemical data to the wet strength produced in paper is discussed. 21 references. E.S.

WHITE WATER

KAHN, J. M. The application of a flocculation type unit in paper mill white water treatment. Paper Trade J. 127, no. 24: 57-9 [T.S. 512-14] (Dec. 9, 1948); Tech. Assoc. Papers 31: 136-8 (1948); *cf.* B.I.P.C. 18: 874.

A Cyclator unit recently installed in a 200-ton two-machine mill manufacturing liner board is performing double duties by reducing stream pollution and recovering approximately 4.2 tons of fiber per day. The white water contains about three pounds suspended solids and, after treatment with alum and activated silica, the 5-day B.O.D. is reduced 59% along with removal of 94% of suspended solids. The fibers are concentrated within the unit and discharged for re-use at a consistency of 1%. The entire operations are virtually automatic with a weir-operated meter proportioning the chemicals according to flow of white water and regulating the discharge of fibers and fillers from the unit so as to maintain a uniform consistency. The Cyclator is a precipitation type unit for white water treatment and is so designed that chemical reactions take place under controlled conditions. These conditions provide for recirculation of previously treated white water along with slurry so that coagulation of the suspended solids takes place in the presence of previously formed floc. The individual particle size of the precipitate is materially increased by this procedure, so that rapid and complete separation of clarified white water and fiber and filler is attained. The precipitated solids are collected and concentrated by revolving scrapers as they are moved to the collection sump for discharge. E.S.

WOOD—CHEMISTRY

HÄGGLUND, ERIK. Fifty years of wood chemistry. Cellulosa och Papper, SPCI 1908-1948: 118-35 (1948). [In German]

A review is presented of theoretical and practical developments in the chemistry of cellulose, lignin, and hemicelluloses, the sulfite cooking process, the manufacture of sulfite alcohol, bleaching of pulp, dissolving pulp, wood saccharification, etc., during the last 50 years. 46 references. E.S.

WOOD—EXTRACTIVES

LESSER, MILTON A. Pine oil. Soap Sanit. Chemicals 24, no. 12: 134-7, 155, 157 (December, 1948).

Pine oil is used extensively in the textile industry and paper production, as a flotation agent in mining, for the manufacture of inks, paints, and varnishes, in formulating cutting oils, etc. It rates high as an antibacterial agent and is important in making disinfectants and preservatives. A review is given of some of the observations made on pine oil as a disinfectant; formulas are included for such products, and uses are suggested. 32 references. R.R.

WOOD—MENSURATION

NORDQUIST, MAGNUS. The timber mensuration law and timber

measuring. Cellulosa och Papper, SPCI 1908-1948: 174-89 (1948). [In Swedish; English summary]

A new timber mensuration law was passed in Sweden on June 20, 1947. The provisions of the law are outlined briefly; they do not hold for wood cut by a company on its own limits and intended for its own use. The length and diameter of the wood is to be given in English units and the classification groups include sulfite wood, sulfate wood, and floated fuelwood. E.S.

WOOD—MOISTURE

STAMM, ALFRED J. The passage of water through the capillary structure of wood. Discussions Faraday Soc. no. 3: 264-73 (1948).

It is shown that the movement of water through wood can be of three types: namely, water-vapor diffusion through microscopically visible structure, bound-water diffusion below the fiber-saturation point through the cell-wall structure, and free-water movement above the fiber-saturation point through the microscopically visible capillary structure as a result of externally applied pressure or of internal capillary forces. It is shown that diffusion through wood can be calculated from capillary-structural data, by considering the diffusion through the various capillaries in parallel as additive and the resistance to diffusion through the various capillaries in series as additive in the same manner as electrical conduction. On this basis, the diffusion of a solute through water-saturated wood is calculated. Agreement between the calculated values and experimentally determined diffusion and electrical-conductivity values is quite good. In a similar way, drying-diffusion constants are calculated for lamina of different moisture contents, at right angles to the drying gradient, by combining vapor diffusion through the microscopically visible capillary structure with bound-water diffusion through the cell walls, with both transposed to the same units. Diffusion constants calculated from rates-of-drying and moisture-gradient data agree well with the theoretical values. Previously obtained variations of the diffusion constant according to variations of moisture content are explained. The resistance to movement of free water through the various types of capillary structure under conditions where no water-air menisci are formed in the wood is analyzed. The movement of free water under drying conditions is shown to occur as a result of capillary forces created in the zone of the wood below the fiber-saturation point. This movement is not a true diffusion but, in the case of the drying of green wood, none of the fiber cavities of which are completely filled with water, the movement is such as to make it appear to be a diffusion phenomenon. E.S.

WOOD OPERATIONS

EKMAN, SVEN. Woods labour problems in Sweden. Pulp Paper Mag. Can. 49, no. 12: 135, 138, 140, 142, 144, 146 (November, 1948).

The author reviews the present status of conditions in Sweden with regard to woods labor changes, wages, possible means of improvement, mechanization, living quarters, a master plan for introducing radical changes gradually, and permanency of employment. E.S.

PULP & PAPER. Figures tell South's story. Pulp & Paper 22, no. 13: 90, 94 (December, 1948).

A survey is presented of southern pulpwood production, with emphasis

on the advances in mechanization. Early in 1948, 21 companies owning 6,439,000 acres of forest land and operating 28 pulp and paper mills, were responsible for the use of 7645 pieces of mobile equipment for handling or producing pulpwood. A fairly recent development, the pulpwood mill, is described, which cuts tree lengths to pulpwood lengths as they are drawn past a swinging cut-off saw on a conveyor. The power saw is universally popular for bucking. To expedite the planting of seedlings, 24 mills have purchased 38 planters capable of setting out 380,000 seedlings daily. Although the planter has reduced the cost of setting out seedlings to an average of $5.76 per acre, in comparison with an estimated $8.00 for hand planting, the great value of the planter is in the maximum planting effected. Certified Tree Farms account for a woodlands acreage of 9,139,191. In addition, many large forest managing lumber companies sell their woodland thinnings and culls to the pulp industry. The South now has more forest land under real management than any other section of the continent. To protect this wealth, over $7,000,000 was spent for forest fire control in 1947. R.R.

WOOD WASTE

ANON. Sawdust gold. Monsanto Mag. 27, no. 6: 18-21 (December, 1948).

Prespine, recently announced by Curtis Companies, Inc., Clinton, Iowa, is a synthetic wood panel made from 93% wood waste—such as sawdust, finely divided wood rejected because of knots and other imperfections, trimmings, etc.—and phenol-formaldehyde resin (Monsanto Resinox). Under the influence of heat and high pressure the raw wood-resin mixture is formed into panels one-fourth inch thick, which can be sawed, planed, and nailed like wood, but which are 10 times as resistant to denting as natural wood and take paint more smoothly. R.R.

SPROULL, REAVIS C. Product development from wood waste. Quart. Bull. Southern Research Inst. 1, no. 3: 13-16 (Fall, 1948).

In 1944, about 45% of the total wood waste, or 49,000,000 tons, was logging waste; 49% (53,000,000 tons) was from the primary manufacture of wood products; and the remainder (7,000,000 tons) was from secondary manufacture. The total waste of 109,000,000 tons does not include the bark. To merit study and the development of its production from wood waste, a product must command a sufficient profitable market, even with competition. The variables involved are so numerous that no two wood-using plants have identical problems of waste-wood utilization. The author discusses briefly the utilization by mechanical, chemical (including distillation, pulping, and hydrolysis), and combination methods. Consideration is given to the method of investigation at Southern Research Institute and a typical example is described. R.R.

X-RAY RESEARCH

MEREDITH, R. X-rays in relation to textiles. J. Textile Inst. 39, no. 4: P132-9; discussion: P139-40 (April, 1948).

The author reviews the application of x-rays to the study of the structure of textile fibers, including cellulose fibers, alginate fibers, protein fibers, and synthetic fibers. 26 references. E.S.

YEAST

SCHMIDT, E. Protein and fat production from sulfite waste liquor

by means of yeast. Angew. Chem. 59 A, no. 1: 16-20 (1947). [In German]

The author reviews German developments in the field of biological protein and fat synthesis, especially from beechwood sulfite waste liquor, with particular reference to the Waldhof and I.G. procedures. Data on the food values of yeast from sulfite waste liquor for humans and animals are included. E.S.

Patent Section

Although the abstracts of the United States patents are prepared from the patents themselves, the initial selection of the patents to be abstracted is made from the Patent Gazette *and, therefore, it is possible that the patent section will not contain all patents of potential interest to the industry. The abstracts of the Canadian patents are prepared from the claims published in the* Canadian Patent Office Record. *In so far as possible, an attempt will be made to indicate patents issued in both countries.*

The patent abstracts are listed under the various headings currently used for the abstracts of periodical articles.

Printed copies of United States patents can be obtained from the Commissioner of Patents, Washington, D.C.; the price is 25 cents per copy. Canadian patents are available only as manuscript or photostatic copies. They are furnished by the Commissioner of Patents, Ottawa, Canada. An estimate of the cost of a patent should be obtained in advance of the order.

ADHESIVES

BAUER, HANS F. Amylaceous composition. Canadian patent 453,199. Filed June 17, 1937. Issued Dec. 7, 1948. 11 claims. Assigned to Stein, Hall & Co., Inc.

This is the same as U. S. patent 2,215,846 (Sept. 24, 1940) and relates to a mixture of starch and urea. C.J.W.

BAUER, HANS F. Composition prepared from dextrins. Canadian patent 453,200. Filed Sept. 3, 1940. Issued Dec. 7, 1948. 16 claims. Assigned to Stein, Hall & Co., Inc.

This is the same as U. S. patent 2,215,847 (Sept. 24, 1940) and relates to an adhesive containing dextrin, urea, and a crystalline compound such as sodium acetate. C.J.W.

BRUCE, DONALD S., and HEISE, HOWARD L. Adhesive and sheet material coated therewith. Canadian patent 452,860. Filed Oct. 28, 1946. Issued Nov. 23, 1948. 6 claims. Assigned to The Gummed Products Company.

An adhesive contains (on a dry basis) at least 75% of a concentrate consisting essentially of lignosulfonic acid from sulfite waste liquors (treated to reduce the sugar content thereof), at least 3% of polyvinyl alcohol, and at least 5% of disodium phosphate. C.J.W.

KELLGREN, WALDO. Pressure-sensitive adhesive. Canadian patent 453,010. Filed Sept. 18, 1942. Issued Nov. 30, 1948. 14 claims. Assigned to Minnesota Mining & Manufacturing Company.

A method is described for transforming rubber into a form suitable for use with pressure-sensitive tapes. C.J.W.

ANTI-STICKS

VANDERBILT, BYRON M., and PARKER, PAUL T. Container. U. S. patent 2,453,880. Filed Dec. 28, 1943. Issued Nov. 16, 1948. 2 claims. Assigned to Standard Oil Development Company.

The container has a coating that permits tacky, rubbery organic materials to be readily removed from it. The coating consists of an aqueous dispersion of a water-soluble metallic soap, 12 parts of a water-insoluble wax, 30 parts of zinc stearate, and 3 parts of a copolymer of butadiene and acrylonitrile. C.J.W.

BARKERS AND BARKING

BRANCH, BURL. Barking drum. U. S. patent 2,456,365. Filed July 27, 1945. Issued Dec. 14, 1948. 4 claims.

A barking drum incorporates a plurality of ring-like elements having inwardly projecting spaced-apart circumferential lugs and longitudinal connecting members which include a friction plate exposed to the interior of the drum and having a centrally disposed longitudinal fin and parallel marginal reinforcing elements extending longitudinally of the members, all components of the longitudinal members forming a means of reinforcing or fastening the members to the rings. C.J.W.

POWER, MICHAEL J. Outfeeding mechanism for portable debarking machines. Canadian patent 453,017. Filed March 31, 1947. Issued Nov. 30, 1948. 6 claims. Assigned to Nekoosa Foundry and Machine Works, Inc.

In a log debarking machine having a feedway frame extending laterally from its outfeeding side and rollers having bearings supported from said frame by inclined sets of leaf springs, the improvement consists in the combination therewith of a power-driven shaft mounted parallel with the rollers and a nearly horizontal belt connection between the shaft and at least one of the rollers, whereby the roller can vibrate under pressure of a rotating log without objectionable change in belt tension. C.J.W.

SWIFT, FRANK H. Hydraulic type log debarker having plural log-rotating chucks independently revolvable about a common axis. U. S. patent 2,453,947. Filed Dec. 22, 1945. Issued Nov. 16, 1948. 5 claims. Assigned to Crown Zellerbach Corporation.

The barker is designed for short lengths of logs in a wide range of diameters. A double pair of positioning arms is provided which carry supporting chucks for the logs and so arranged that, during the time one log is being barked, another log can be loaded into the machine. C.J.W.

BLACK LIQUOR

ULLMANN, GUSTAV. Method of utilizing effluents from the treatment of cellulosic material. Canadian patent 452,910. Filed Oct. 3, 1945. Issued Nov. 23, 1948. 3 claims. Assigned (one half) to English Cellulose Derivatives Limited.

Waste alkaline effluents are causticized without the addition of fresh sodium compounds and the causticized effluent (without the addition of fresh chemicals) is used for pulping a further batch of cellulosic material; the raw material may be given an acid pretreatment. C.J.W.

BOARD

FAIR, WILLIAM F., JR. Bituminous laminated material. U. S. patent 2,455,923. Filed Feb. 4, 1944. Issued Dec. 14, 1948. 3 claims. Assigned to Koppers Company, Inc.

A laminated sheet material, comprising a plurality of paper sheets bonded by means of ordinary bituminous layers, such as asphalt or coal tar pitch coatings, is considerably improved by covering the outer surfaces and edges with a coating of coal-digestion pitch. C.J.W.

BOARD SPECIALTIES

BOWERS, FREDRICK H. Method of fabricating merchandise holders and display devices. U. S. patent 2,455,109. Filed June 28, 1945. Issued Nov. 30, 1948. 1 claim.

A method is described for forming a display device from cardboard, on either side of which is placed a sheet of paper. In the discussion, the item packaged is the flint for pocket lighters. C.J.W.

HARHAY, JOHN. Bottle carrier. U. S. patent 2,453,908. Filed April 27, 1946. Issued Nov. 16, 1948. 4 claims. Assigned to Los Angeles Paper Box Factory.

A bottle carrier is manufactured with triangular ends to improve the strength and save material. C.J.W.

STENZ, BERNARD F. Valance. Canadian patent 452,944. Filed Aug. 10, 1945. Issued Nov. 30, 1948. 11 claims.

The construction of a valance (decorative drapery) is described, the panels being of cardboard with paper covering having ornamental designs. C.J.W.

CALCIUM CARBONATE

RAFTON, HAROLD R. Treatment of pigment comprising calcium carbonate. Canadian patent 453,320. Filed July 2, 1943. Issued Dec. 14, 1948. 10 claims. Assigned to Raffold International Corporation.

This is the same as U. S. patent 2,447,532 (Aug. 24, 1948); *cf.* B.I.P.C. 19: 130. C.J.W.

COOKING PROCESS

WALLIN, JOHAN H. Digestion of cellulose. Canadian patent 452,952. Filed April 14, 1944. Issued Nov. 30, 1948. 10 claims. Assigned to Aktiebolaget A. Ekströms Maskinaffär.

In a pulping operation in which two or more digesters are operated simultaneously at different digesting stages, steam or a mixture of steam and gas is removed from the top of one digester under full operating pressure and introduced into the lower portion of a second digester which has not been brought up to full operating pressure. The arrangement of pipes for such an operation is described. C.J.W.

DISPENSING CONTAINERS

LEHMAN, CHESTER M. Dispensing container. U. S. patent 2,455,685. Filed Oct. 1, 1945. Issued Dec. 7, 1948. 3 claims.

The container has yieldable bottom edges which normally confine the contents but provide for the successive forcible removal by hand from the bottom of the container; it is designed for matches, toothpicks, and like articles. C.J.W.

VERNER, STANLEY. Dispensing container. U. S. patent 2,457,107. Filed Feb. 24, 1945. Issued Dec. 21, 1948. 2 claims.

A one-piece container for gummed paper is provided with a novel integral flap adapted to serve as a cutting edge for the paper. C.J.W.

FLOOR COVERING

JONES, JAMES R. Floor covering. U. S. patent 2,455,777. Filed Nov. 29, 1944. Issued Dec. 7, 1948. 5 claims. Assigned to Paulsboro Manufacturing Company.

The floor covering is composed of a paper sheet (0.005 to 0.007 inch thick) which is saturated, printed, adhered to a felt base, and covered with a wear layer. C.J.W.

FOLDING BOXES

BAKER, JAMES A. Package assembly. U. S. patent 2,456,610. Filed July 2, 1945. Issued Dec. 21, 1948. 4 claims. Assigned to Milprint, Inc.

The patent covers an improved package assembly for tapered cup-shaped containers, whereby one or more of the individual cups may be effectively maintained in upright position and confined within a rectangular prismatic space for compact and stable stacking. C.J.W.

BEHRENS, ALBERT. Display carton with sliding closure. U. S. patent 2,456,168. Filed Oct. 11, 1946. Issued Dec. 14, 1948. 8 claims.

A display container is described which has an opening capable of being opened and closed somewhat in the manner of a roll top desk. C.J.W.

BENOIT, LEON. Cellular carton. U. S. patent 2,455,291. Filed July 4, 1945. Issued Nov. 30, 1948. 4 claims. Assigned to Robert Gair Company, Inc.

A carton, suitable for eggs, fruits, candies, and the like, is formed from a pair of flat blanks locked into a unitary structure by end locks which also engage the covers and provide means for lifting the carton by the covers when they are closed. The blanks each have a row of flaps which are turned to form cross walls and means for engaging each cross wall through its own side wall and resiliently locking it in place. C.J.W.

EVANS, GUY J. Folding box. Canadian patent 452,924. Filed July 17, 1946. Issued Nov. 30, 1948. 2 claims.

A folding box consists of a side wall having opposing ends which are adapted to overlap one another and locking means for connecting the ends of the wall. C.J.W.

GUYER, REYNOLDS. Method for sealing cartons. U. S. patent 2,455,304. Filed Nov. 9, 1944. Issued Nov. 30, 1948. 16 claims. Assigned to Waldorf Paper Products Company.

A coating of thermoplastic material is provided on the interior surfaces of the carton; each end of the carton is partially sealed by folding the bellow folds and the associated carton side walls outwardly. This action also folds one end panel across the open end of the carton so that the sealing flap thereon is superimposed upon a marginal portion of the opposite end panel. Heat and pressure are then applied. C.J.W.

MULNIX, ERSEL C. Millinery box. U. S. patent 2,454,196. Filed Nov. 8, 1946. Issued Nov. 16, 1948. 3 claims.

A container is formed from a single sheet which is specially designed as a millinery box. C.J.W.

SCHER, JOSEPH. Folding box. U. S. patent 2,454,573. Filed Aug. 3, 1945. Issued Nov. 23, 1948. 1 claim.

A container is described which is designed primarily for the shipping of frozen foods, including fruits, vegetables, and meats; it is sufficiently strong to permit stacking a number of such boxes. C.J.W.

FUNGI

BENIGNUS, PAUL G. Fungus-proofing composition. U. S. patent 2,457,025. Filed Aug. 11, 1944. Issued Dec. 21, 1948. 11 claims. Assigned to Monsanto Chemical Company.

A fungus-proofing composition comprises a water-in-oil emulsion containing in the oil phase a relatively water-insoluble fungicidal agent, such as copper 8-hydroxyquinoline, a modified alkyd resin having a relatively high ratio of fatty acid residue to phthalic anhydride residue, and a mixture of chlorinated diphenyls. A part or all of the modified alkyd resin may be present in the composition in the form of an ammonium soap. Various formulas are given. C.J.W.

LEATHERBOARD AND ARTIFICIAL LEATHER

RICHTER, HERMAN W. Felted water-resistant sheet fibre board. Canadian patent 453,173. Filed June 26, 1947. Issued Dec. 7, 1948. 4 claims. Assigned to George O. Jenkins Company.

The product consists of 8 to 20% by weight of a bituminous pitch and more than 50% of fibrous material comprising cellulosic and leather fibers (at least 50% cellulosic fibers and less than 50% leather fibers), the leather fibers being at least 9% of the weight of the board. The material is suitable for use as heel bases in shoes. C.J.W.

MACHINERY—BEATERS

STEWART, ANDREW G. Beating engine and the like. U. S. patent 2,455,622. Filed June 4, 1945. Issued Dec. 7, 1948. 4 claims.

In a beater the cover consists of a cylindrical portion to fit over the beater roll and an adjoined delivery-receiving hood which are joined in a V formation, the apex of which constitutes a "doctor" to prevent pulp traveling around with the roll. At the V formation, a liquid-holding trough is formed by means of side plates, by means of which water can be introduced into the beater for washing purposes. C.J.W.

MACHINERY—CONSISTENCY REGULATORS

KARLSSON, KARL A. Apparatus for regulating the concentration of fibrous suspensions. Canadian patent 453,233. Filed June 19, 1947. Issued Dec. 14, 1948. 10 claims.

The apparatus consists of a scale beam, an element carried by an arm of the scale beam for receiving samples of the suspension to be controlled and for varying the moment of the arm in conformity with changes in the

concentration of the samples, means carried by another arm of the scale beam for balancing the weight of the first arm and sample-receiving element thereof, and power-driven means for changing the concentration of the suspension. C.J.W.

MACHINERY—CONVERTING MACHINERY

ELLIOTT, PAUL C. Machine for forming containers from flexible materials. U. S. patent 2,453,836. Filed Nov. 7, 1941. Issued Nov. 16, 1948. 27 claims. Assigned to Luther K. Funkhouser.

A machine is described for forming containers for milk or other liquids from strips of paper. Methods are provided for impregnating the container with wax or the like and hardening the wax preparatory to filling it. With minor adjustments, the machine will produce containers of different sizes on a single mandrel. C.J.W.

FLATER, HAROLD, WAERNHOFF, ERNST T., and FRANSON, NILS G. Twinemaking machine. U. S. patent 2,453,789. Filed Dec. 9, 1947. Issued Nov. 16, 1948. 12 claims. Assigned to International Harvester Company.

This is a division of U. S. patent 2,450,947 (Oct. 12, 1948); *cf.* B.I.P.C. 19: 216. It relates specifically to a spinning disk for twisting paper twine. C.J.W.

OGLESBY, NICHOLAS E. Apparatus for the manufacture of abrasive webs. U. S. patent 2,456,985. Filed Aug. 25, 1943. Issued Dec. 21, 1948. 20 claims. Assigned to Behr-Manning Corporation.

This patent is a division of U. S. patent 2,403,018 (July 2, 1946). Steam under pressure is used as the atomizing agent and the product is applied in a semi-enclosed space substantially filled with an atmosphere of steam. Glue is the most commonly used adhesive but synthetic and natural resins can be used in suitable solvents. C.J.W.

VAN BRUMMELEN, MARINUS. Box blank separator. U. S. patent 2,455,836. Filed July 11, 1947. Issued Dec. 7, 1948. 6 claims.

A device is described for consecutively separating individual box blanks from a plurality of such blanks stacked on a rack. C.J.W.

MACHINERY—HEAD BOX

HORNBOSTEL, LLOYD. Stock inlet. Canadian patent 453,127. Filed Jan. 30, 1947. Issued Dec. 7, 1948. 16 claims. Assigned to Beloit Iron Works.

A method of maintaining a constant stock level in a head box consists in pumping stock and air into the head box and venting air and stock from the head box at the desired level so that an increase in stock above the desired level will close the vent to increase the air pressure and thus decrease the level, and a lowering of the stock level will open the vent to decrease the air pressure and thus increase the stock level. C.J.W.

MACHINERY—JORDANS

MESSINGER, WILLIAM, and JONES, DWIGHT E. Jordan apparatus.

U. S. patent 2,456,883. Filed Sept. 27, 1945. Issued Dec. 21, 1948. 3 claims. Assigned to E. D. Jones & Sons Company.

Various modifications of the jordan construction are outlined. C.J.W.

MACHINERY—PACKAGING MACHINERY

GRUPE, WILLIAM F. Machine for and method of banding boxes. U. S. patent 2,456,059. Filed March 6, 1946. Issued Dec. 14, 1948. 6 claims. Assigned to Beech-Nut Packing Company.

A machine is described for banding filled cartons so that they can be shipped as a single package. C.J.W.

MACHINERY—PASTING MACHINERY

BOJANOWER, ALBERT M. Method for heat sealing the seams of paper bags. U. S. patent 2,453,889. Filed March 7, 1944. Issued Nov. 16, 1948. 2 claims. Assigned to Western Waxed Paper Company.

In the sealing of seams of waxed paper, better results are obtained by the application of steam directly to the paper at the seam than by the use of metal heated by the steam. An apparatus is described for this purpose. C.J.W.

GAMBLE, HEDWIG. Gumming apparatus for cigarette paper. Canadian patent 452,769. Filed May 21, 1946. Issued Nov. 23, 1948. 4 claims.

This patent covers a machine for applying strips of gum longitudinally to a continuously running web of paper. The thickness of the gum deposit can be varied. Also, the web of paper can be lifted from the gumming rolls when the operation of the machine is interrupted. C.J.W.

MACHINERY—REFINERS

BIDWELL, GEORGE L. Apparatus for producing variegated fiber lengths in the manufacture of paper. U. S. patent 2,456,249. Filed April 21, 1944. Issued Dec. 14, 1948. 2 claims. Assigned to Riegel Paper Corporation.

A tub of large capacity is combined with a pump, special piping, and grinding elements located outside the tub so that, in addition to the main circulation of the pulp through the tub, a controlled quantity of fiber is by-passed so that it is returned to the grinding elements outside the tub without making a complete circuit around the tub. Different stocks can be hydrated, refined, and prepared for the manufacture of paper with control of the variegated fiber length by controlling the portion of the stock which is by-passed. The apparatus is described. C.J.W.

MACHINERY—SCREENS

JONSSON, NILS W. Means of screening suspensions of solids. Canadian patent 452,775. Filed June 18, 1945. Issued Nov. 23, 1948. 11 claims; *cf.* B.I.P.C. 19: 326.

A screening hopper is arranged in a vat so that its screening plate is situated between a feed for the stock suspension and a discharge for the

screened stock; the screening hopper or the vat is rotary; either the hopper or the vat is resiliently suspended and capable of being set in vibratory motions proceeding in planes parallel to the axis of rotation. C.J.W.

LINDBLAD, KARL R. Screening drum for dewatering suspensions. Canadian patent 453,728. Filed Feb. 6, 1946. Issued Dec. 28, 1948. 5 claims. Assigned to Svenska Cellulosa Aktiebolaget; *cf.* B.I.P.C. 17:534.

The drum consists of an outer, generally cylindrical shell provided with screening openings, an inner imperforate shell spaced from the outer shell, a plurality of longitudinal partitions between the outer and inner shells dividing the space into a plurality of cells, and discharge ducts communicating between the cells and the interior of the drum. C.J.W.

MACHINERY—SLICE

RUSSELL, ANDREW N. Slice for paper-making machine. Canadian patent 453,242. Filed June 30, 1947. Issued Dec. 14, 1948. 9 claims.

The slice consists of a flexible blade and a rigid carrier for the blade, with means for attaching the blade to the carrier; adjusting means are provided so that the blade can be flexed and also can pivot on the carrier. C.J.W.

MOLDED PULP ARTICLES

CHAPLIN, MERLE P. Moulded pulp article. Canadian patent 453,273. Filed Feb. 12, 1947. Issued Dec. 14, 1948. 16 claims. Assigned to Chaplin Corporation.

A method of molding a ribbed paper cup is described. C.J.W.

COX, JOHN W. Cellular carton. U. S. patent 2,455,295. Filed Oct. 23, 1942. Issued Nov. 30, 1948. 5 claims. Assigned to Shellmar Products Corporation.

The patent covers a molded pulp carton, preferably of the two-by-six type, which is divisible into two or more portions along a transverse line or lines of severance and which has integrally molded bracing members adjacent the line or lines, whereby the carton prior to or after being divided has the desired rigidity at all points. C.J.W.

RANDALL, WALTER H. Pocketed moulded pulp receptacle. Canadian patent 453,216. Filed Feb. 24, 1947. Issued Dec. 7, 1948. 2 claims. Assigned to Keyes Fibre Company.

This is the same as U. S. patent 2,428,384 (Oct. 7, 1947); *cf.* B.I.P.C. 18: 211. C.J.W.

RISCH, ARTHUR H. Art of manufacturing aquatic decoys. U. S. patent 2,453,758. Filed April 20, 1945. Issued Nov. 16, 1948. 2 claims. Assigned to Pulp Reproduction Company.

This is a continuation of U. S. patent 2,247,450 (July 1, 1941). An improved method is described for molding these decoys from pulp. C.J.W.

SHEPARD, ERNEST L. Packing for fragile articles. Canadian patent 453,215. Filed Nov. 26, 1946. Issued Dec. 7, 1948. 21 claims. Assigned to Keyes Fibre Company.

A packing unit is formed from a single sheet of molded pulp and is designed for shipping tubes. C.J.W.

PAPER—COATED

BARRETT, WILLIAM H., and ASDELL, BERNARD K. Process and apparatus for coating paper. Canadian patent 453,300. Filed Jan. 10, 1946. Issued Dec. 14, 1948. 9 claims. Assigned to Minnesota and Ontario Paper Company.

A coating apparatus consists of a backing roll for supporting a web of paper while the coating is being applied, an applicator roll for applying the coating material to the paper, a metering roll for controlling the quantity of coating applied to the applicator roll (the applicator and metering rolls being mounted in substantially the same horizontal plane), a fountain having an open side directed toward the applicator and metering rolls so that the fountain and the rolls form a coating container, and means for supplying coating material to the fountain. C.J.W.

CRAIG, WILLIAM L. Coating composition. Canadian patent 452,906. Filed Dec. 11, 1942. Issued Nov. 23, 1948. 6 claims. Assigned to R. T. Vanderbilt Company, Inc.

This is the same as U. S. patent 2,394,233 (Feb. 5, 1946) and relates to a method of amylolyzing starch in the presence of the pigment and filler. C.J.W.

DODGE, LLOYD L. Method of treating fibrous web material. Canadian patent 453,698. Filed July 17, 1943. Issued Dec. 28, 1948. 3 claims. Assigned to National Paper and Chemical Company.

During the forming and drying of a paper web, it is coated with an aqueous dispersion of a protein such as casein and the water-insoluble proteins naturally present in oleaginous seed, a paraffin wax, a plasticizer, and a methylene-containing hardening agent; on drying the web is stronger and more resistant to moisture, grease, and gases because of the resulting hardening of the casein and the fusion of the wax on the paper fibers. C.J.W.

FAEBER, HARRY W. Coating machine. U. S. patent 2,456,495. Filed Aug. 1, 1945. Issued Dec. 14, 1948. 6 claims. Assigned to Time, Inc.

In the coating of a continuously rapidly moving web, a plurality of layers of coating material is applied successively and in relatively close adjacent stations to the material as it passes through the machine. The machine also dries the coated web before it is subjected to forces that might tend to impair such surface. C.J.W.

PAPER—SHEET FORMATION

ERICKSON, DONALD R. Manufacture of paper. Canadian patent 453,230. Filed March 10, 1947. Issued Dec. 14, 1948. 18 claims.

Substantially unhydrated cellulosic fibers are bonded by a water-insoluble hydroxyethylcellulose; apparently the bonding is carried out in an aqueous solution containing less than 3% sodium hydroxide. C.J.W.

PAPER SPECIALTIES

AMBERG, WALTER E. Paper cup and handle therefor. U. S. patent 2,454,906. Filed Nov. 19, 1945. Issued Nov. 30, 1948. 5 claims. Assigned to Lily-Tulip Cup Corporation.

The side wall of a paper cup is provided with a collapsible handle having a vertically arranged handle portion hinged at its top to the side wall and a vertically arranged arm portion hinged at its top to the side wall below the hinge point of the handle portion and also hinged at its bottom to the handle portion. The handle is adapted to lie close to the side wall of the cup. C.J.W.

BOOTH, RICHARD N. Method of making cigarette papers. Canadian patent 453,361. Filed Aug. 30, 1946. Issued Dec. 21, 1948. 10 claims.

A method of forming finished cigarette papers from a strip of paper of a width corresponding with the length of the desired cigarette paper includes the steps of feeding forward such a strip, moistening the strip at intervals corresponding to the width of the desired paper, mechanically tensioning the paper strip between the leading and trailing edges of the foremost cigarette paper, and mechanically detaching this paper at its trailing edge. C.J.W.

BRADY, CHARLES V., and WILLIAMS, RUSSELL J. Bag structure and process of manufacture. Canadian patent 453,402. Filed Sept. 12, 1946. Issued Dec. 21, 1948. 8 claims. Assigned to Bemis Bro. Bag Company.

A method is described for forming a flat bag having side gussets. C.J.W.

BYERS, RALPH J., and CHRISTIAN, MOSS B. Veneer and method of making same. Canadian patent 453,468. Filed Aug. 27, 1945. Issued Dec. 21, 1948. 2 claims. Assigned to Chicago Mill and Lumber Company.

This corresponds to U. S. patent 2,442,115 (May 25, 1948); *cf.* B.I.P.C. 18: 807. C.J.W.

KERN, EDWARD A., and MILLER, HARRY F. Dielectric sheet material. Canadian patent 452,812. Filed May 15, 1945. Issued Nov. 23, 1948. 4 claims. Assigned to Canadian General Electric Company, Limited.

This is the same as U. S. patent 2,418,354 (April 1, 1947); *cf.* B.I.P.C. 17: 536. C.J.W.

ORCHARD, HERMAN C. Method of design formation on coloured paper. Canadian patent 453,019. Filed April 28, 1947. Issued Nov. 30, 1948. 3 claims. Assigned to Orchard Paper Company.

This corresponds to U. S. patent 2,420,336 (May 13, 1947); *cf.* B.I.P.C. 17: 604. C.J.W.

PEARSON, JOHN W. Pressure-sensitive adhesive sheet. U. S.

patent 2,453,258. Filed April 6, 1946. Issued Nov. 9, 1948. 9 claims. Assigned to Minnesota Mining & Manufacturing Company.

A pressure-sensitive adhesive sheet is formed by the union of a cellulose acetate film and a regenerated cellulose film with a pressure-sensitive cement; the outer surface of the regenerated cellulose film also carries a pressure-sensitive adhesive. Various formulas for the adhesive are given; the basis of some of these is a mixture of rubber latex and casein. C.J.W.

ROSELLE, WALTER A. Container. U. S. patent 2,456,735. Filed Nov. 19, 1945. Issued Dec. 21, 1948. 3 claims.

A paper container, especially suitable for dispensing milk and other liquids, has a body with a triangular spout at one corner. C.J.W.

ROWE, MURRAY E. Paper drinking cup. Canadian patent 453,241. Filed June 6, 1947. Issued Dec. 14, 1948. 7 claims.

An antisplash device for a cup consists of a shallow, hollow, floatable body having a flat bottom surface for engagement with the surface of the liquid in the cup. The device may be made of paper. C.J.W.

WEIDNER, CHARLES L., and EGER, LASZLO W. Adhesive tape for laminating materials and adhesives. Canadian patent 453,289. Filed Jan. 11, 1944. Issued Dec. 14, 1948. 6 claims. Assigned to Johnson & Johnson Limited.

A tape for laminating plywood material comprises a flexible fibrous backing impregnated with an adhesive, the major portion of which is a partially reacted phenol-aldehyde, urea-aldehyde, melamine-formaldehyde, or the like, together with a minor portion of compatible polymeric cellulose derivatives and the vinyl esters and alcohols and their copolymers. C.J.W.

PULP STONES

HOWE, WALLACE L., and WASHBURN, LORENZO S. Pulpstone. Canadian patent 453,701. Filed Aug. 31, 1946. Issued Dec. 28, 1948. 6 claims. Assigned to Norton Company.

This is the same as U. S. patent 2,421,885 (June 10, 1947); *cf.* B.I.P.C. 17: 672. C.J.W.

HOWE, WALLACE L., and WASHBURN, LORENZO S. Pulpstone. Canadian patent 453,702. Filed Aug. 31, 1946. Issued Dec. 28, 1948. 2 claims. Assigned to Norton Company.

This is the same as U. S. patent 2,421,886 (June 10, 1947); *cf.* B.I.P.C. 17: 672-3). C.J.W.

ROOFING FELTS

REYNOLDS, FRANK P. Manufacture of artificially coloured granules. Canadian patent 453,129. Filed Jan. 24, 1947. Issued Dec. 7, 1948. 7 claims. Assigned to Bird & Son, Inc.

Coating roofing granules are formed by mixing particles of a refractory granule base with substantially dry hydrous clay and dry powdered sodium silicate, adding a small quantity of water, and heating the mixture to a temperature at which the clay and silicate react, thereby producing on the particles an insoluble weather-resistant coating. C.J.W.

SHIPPING CONTAINERS

BEATTIE, ROBERT. Container. U. S. patent 2,456,483. Filed March 13, 1945. Issued Dec. 14, 1948. 3 claims. Assigned to Tide Water Associated Oil Company.

A unit container for lubricating oils and the like proofed to prevent seepage or leakage comprises a nonmetallic, deformable, substantially tubular body portion, a lining of separate, preformed sheet proofing material which extends to a point substantially removed from either end of the interior surface, an adhesive on the unlined surfaces, and flanged, deformable top and bottom caps fitting over the ends of the body portion. C.J.W.

BELSINGER, JACK R. Easy packing container. U. S. patent 2,453,614. Filed May 15, 1946. Issued Nov. 9, 1948. 2 claims. Assigned to Belsinger Inc.

A container of telescoping type is described which can be packed in the vertical position to a total depth exceeding the comfortable reach of the packer and control can be exerted upon cloth bolts already inserted. It is specially designed for packing rayon yarn. C.J.W.

BENTHAM, ALBERT E. Carton. U. S. patent 2,454,029. Filed July 21, 1945. Issued Nov. 16, 1948. 1 claim. Assigned to The Baltimore Paper Box Co.

This is an improvement on U. S. patent 2,398,402 (April 16, 1946). It relates to a fiberboard egg case. C.J.W.

BLACKMAN, SMITH A. Shipping carton. U. S. patent 2,453,829. Filed Sept. 26, 1946. Issued Nov. 16, 1948. 1 claim. Assigned to Gaylord Container Corporation.

This is an extension of U. S. patent 2,214,220 (Sept. 10, 1940) to Beaman. The object is to provide an end construction for heavy-duty shipping cartons which will increase the strength and load-carrying capacity. Auxiliary top and/or bottom end closures are clamped within the ends of the tubular body of the carton by the exterior locking band for the main end closures. These auxiliary end closures may form ice compartments in the ends of the container. C.J.W.

COYLE, JOHN. Method of attaching metal closures to containers. U. S. patent 2,455,737. Filed July 29, 1944. Issued Dec. 7, 1948. 1 claim. Assigned to Continental Can Company, Inc.

The invention covers a method of seaming a metal end to a container body having flat sides and rounded corners so that the seam connecting the metal end to the body is of uniform tightness along the flat sides of the container and also along the rounded corners. C.J.W.

DUERDEN, ALAN, and SHAKESBY, LEONARD. Container for liquid fuels. Canadian patent 453,286. Filed July 22, 1944. Issued Dec. 14, 1948. 7 claims. Assigned to Imperial Chemical Industries Limited.

Flexible sheet material suitable for use as the fuel-retaining wall in a container for liquid hydrocarbon fuel comprises two or more layers of fabric or other sheet material bonded together with an interlayer of a petroleum-

resistant composition from the group consisting of cellulose derivatives and synthetic rubber-like materials and faced with a plasticized composition containing a polyvinyl acetal resin. C.J.W.

HUTT-BRENNING, VINCENT A. Manufacture of containers from fibre board and like sheet material. Canadian patent 452,934. Filed Sept. 5, 1946. Issued Nov. 30, 1948. 13 claims.

The sides and ends of a fibrous container are secured with metallic strips. C.J.W.

JACKSON, GEORGE F. Method of forming metal closures for paper containers. U. S. patent 2,455,063. Filed Oct. 7, 1943. Issued Nov. 30, 1948. 1 claim. Assigned to Continental Can Company, Inc.

The method consists of inserting in an open end of a paper container body a metallic end closure having a central body closure portion merging into a tapered heel and an outwardly turned flange, bending the flange down over the open end of the body and against the outside wall in the form of a skirt, and clamping the body end portion between the heel and skirt in endwise tapering relation to the main body of the container. C.J.W.

JOHNSON, HENRY A. Collapsible container. U. S. patent 2,455,124. Filed Oct. 15, 1945. Issued Nov. 30, 1948. 2 claims.

The container, which is suitable for packaging a variety of materials, such as asphalt, rosin, ice cream, and the like (i.e., compounds which are poured in and allowed to harden therein), has a bottom wall construction or closure which effectively prevents leakage of the liquid or semiliquid contents. C.J.W.

RUSHING, FRED L. Container. U. S. patent 2,456,841. Filed June 22, 1945. Issued Dec. 21, 1948. 1 claim. Assigned to Gaylord Container Corporation.

The invention relates to containers, particularly folded-blank fruit and vegetable shipping cartons of the kind having a body with a slip cover and hand holes to facilitate handling. The principal improvement is a method for automatically locking the cover without the use of separate fastening members. C.J.W.

SHIPPING CONTAINERS—FIBER DRUMS

CARPENTER, HERBERT L. Container. U. S. patent 2,456,047. Filed June 19, 1945. Issued Dec. 14, 1948. 1 claim. Assigned to Carpenter Container Corporation.

This is a division of U. S. patent 2,382,858 (Aug. 14, 1945). The body member is cylindrical and made of laminated fiber sheets wound around a mandrel. Each end of the drum is encircled by a band of sheet metal. The closure is of metal, plastic, wood, or fiber. C.J.W.

STORAGE BATTERIES

HINDALL, ALVA L. Storage battery expander. Canadian patent 452,857. Filed Aug. 27, 1945. Issued Nov. 23, 1948. 8 claims. Assigned to General Motors Corporation.

An expander for improving the cold discharge rate of a negative plate

of a storage battery consists of 34 parts red oak sawdust, 8.5 parts carbon black, 7 parts sodium hydroxide, 17 parts barium hydroxide, and 34 parts sulfite waste liquor. C.J.W.

HINDALL, ALVA L. Storage battery plate paste expander. Canadian patent 452,858. Filed Jan. 23, 1948. Issued Nov. 23, 1948. 6 claims. Assigned to General Motors Corporation.

This corresponds to U. S. patent 2,436,299 (Feb. 17, 1948); *cf.* B.I.P.C. 18: 490-1. C.J.W.

SULFITE WASTE LIQUOR

BEATH, LAURENCE R., and HILL, HAROLD S. Method of concentrating waste sulfite liquor with recovery of sulfur dioxide. U. S. patent 2,453,775. Filed April 17, 1945. Issued Nov. 16, 1948. 12 claims. Assigned to Price Brothers & Company, Limited.

Waste sulfite liquor at the desired maximum concentration is passed to spaced electrodes between which is maintained a difference in electrical potential whereby an electrical current is caused to flow through the waste liquor; this current generates the heat required for evaporation of the waste liquor and liberates sulfur dioxide and water vapor, which are removed from the reaction zone. The partially reacted sulfite waste liquor is returned to the cycle and the desired concentration is maintained by addition of fresh waste liquor. The apparatus is described. Data are given also for the electrical conductivity of the waste liquor at various concentrations of solids. C.J.W.

TEXTILE INDUSTRY AND FABRICS—FIREPROOFING

WALTER, ZACHARY T. Method of making a fire resistant laminated fabric. U. S. patent 2,455,454. Filed Aug. 4, 1944. Issued Dec. 7, 1948. 4 claims.

Porous fabric sheets are impregnated with a chlorinated paraffin in a solvent, the sheets are dried, a number of sheets are coated with a solution of cellulose acetate in a solvent for the chlorinated paraffin, and the sheets are superimposed while wet. C.J.W.

TRANSPARENT CONTAINERS

FOGEL, SAMUEL. Display package. Canadian patent 452,926. Filed May 18, 1946. Issued Nov. 30, 1948. 3 claims.

A display container consists of an outer casing having a bottom wall and transparent top and side portions. Its construction is described. C.J.W.

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